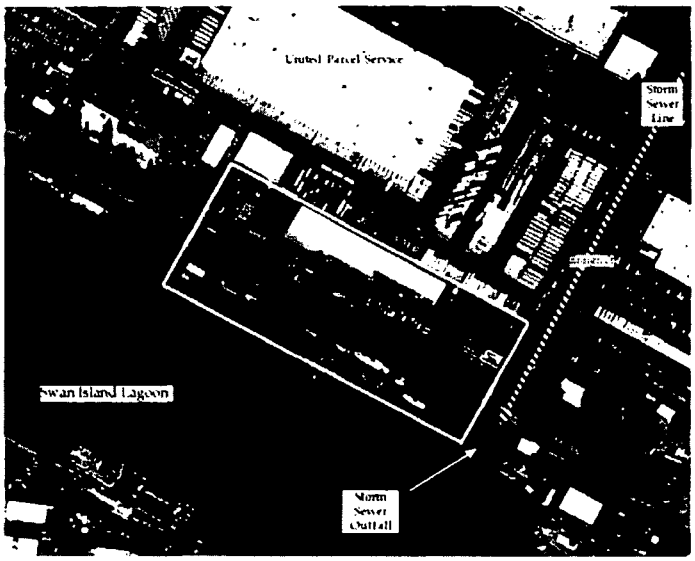
STORM WATER SOURCE CONTROL EVALUATION WORK PLAN

THE MARINE SALVAGE CONSTORIUM, INC. (DBA FRED DEVINE DIVING & SALVAGE, CO.) 6211 N. ENSIGN STREET PORTLAND, OREGON 97217



Prepared for:

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Submitted By:

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Date: April 16, 2007

Project Number: 521-07001-01

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Prepared for:

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Prepared by:

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TABLES AND FIGURES

ACRONYMS AND ABBREVIATIONS

BES	City of Portland Bureau of Environmental Services
BMPs	best management practices
COC	chain-of-custody
COIs	constituents of interest
DRO	diesel-range organics
EEM	Evergreen Environmental Management, Inc.
ENW	EVREN Northwest, Inc.
EPA	U.S. Environmental Protection Agency
FDDS	Fred Devine Diving & Salvage, Co.
JSCS	Joint Source Control Strategy
MDLs	method detection limits
mg/Kg	milligrams per Kilogram
MRLs	method reporting limits
NPDES	National Pollution Discharge Elimination System
NRC	National Response Corporation
OARs	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
PA	Preliminary Assessment
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
RI/FS	Remedial Investigation/Feasibility Study
RRO	residual-range organics
SCE	source control evaluation
SLV	screening level value
SVOCs	semi-volatile organic constituents
SWPCP	storm water pollution control plan
TSS	total suspended solids
VOCs	volatile organic constituents
XPA	Expanded Preliminary Assessment

1.0 INTRODUCTION

At the request of the Oregon Department of Environmental Quality (ODEQ), EVREN Northwest, Inc. (ENW) has prepared this Storm Water Source Control Evaluation Work Plan for The Marine Salvage Consortium, Inc., dba Fred Devine Diving & Salvage, Co. (FDDS) property located at 6211 N. Ensign Street, Portland, Oregon (Figure 1). This Work Plan has been prepared in accordance with ODEQ's December 21, 2006, letter outlining the requirements of the source control evaluation (SCE).[1] Additionally and as directed by ODEQ, the format of this Work Plan follows a similar work product[2] provided to ENW by ODEQ.

1.1 Regulatory Framework for Storm Water Source Control Evaluation

In December 2000, a heavily industrialized stretch of the Willamette River, known as the Portland Harbor, was listed on the National Priorities List (Superfund). Various public and private parties are working to investigate and cleanup the Portland Harbor. The U.S. Environmental Protection Agency (EPA) is the lead agency overseeing the investigation and cleanup of the sediments in the Willamette River; ODEQ is the lead agency responsible for the investigation and cleanup of "upland" sites (sites that are adjacent and a potential source of contaminants to the river).

Due to its location, the FDDS property has been identified as an upland site. Therefore the site requires investigation as a source of potential impacts to the Portland Harbor.

The Portland Harbor Joint Source Control Strategy (JSCS) was jointly developed by EPA and ODEQ to coordinate upland source control. As stated by the document, the overarching goal of the JSCS is to identify, evaluate, and control sources of contamination that may impact the Willamette River in a manner that is consistent with the objectives and schedule for the Portland Harbor remedial investigation and feasibility study (RI/FS). The JSCS provides the criteria by which work at the subject site must be completed within the framework of applicable state and federal regulations, including Oregon Administrative Rules (OAR) Chapter 340 Division 122 (Hazardous Substance Remedial Action Rules).

1.2 Purpose of the Storm Water Source Control Evaluation

The Storm Water Evaluation is being completed as part of the SCE process as outlined by the JSCS. In brief, this Work Plan examines existing data, proposes applicable catch basin sediment and storm water sampling and analysis protocols and presents a summary of ongoing source control measures and best management practices (BMPs) at the FDDS site. A main objective of this work is to obtain sufficient data to allow ODEQ to prepare a Source Control Memorandum for review by the EPA.

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[1] ODEQ. 2006. Letter to Mr. Leitz of FDDS from Mark Pugh, R.G., of ODEQ. December 21.

[2] Maul, Foster & Alongi, Inc. 2006. *Stormwater Evaluation Work Plan, Truck Manufacturing Plan, Freightliner, LLC.* April 21.

2.0 SITE SETTING

2.1 Description and Location

The FDDS property is:

- Located at 6211 N. Ensign Street, Portland, Multnomah County, Oregon 97217 (Figure 1).
- Comprised of 5.74 acres.
- Rectangular in shape with the long axis oriented northwest to southeast.
- Adjacent to the Swan Island Basin which borders the site's southwest side.
- Generally level with an approximate elevation of 20 feet mean sea level.[3]
- Zoned IG2i: General Industrial 2, with a River Industrial overlay.[4]

Site access is from N. Ensign Street to the eastern end of the property where a 7,000-square foot two-story office building (built in 1973) is located with associated vehicle parking. The central portion of the property is occupied by a 24,500-square foot warehouse/shop (built in phases in 1976 and 1995). Also centrally located along the site's southern side is a facility dock built in 1984. The western end of the site is graveled and used for miscellaneous storage. See Figure 2, Site Map, and Figure 3, Aerial Map.

Surrounding properties are also zoned industrial. A large United Parcel Service facility is located north of the site. N. Ensign Street and the Port of Portland Navigation Division facility are located to the east. U.S. Government property utilized by the Navy and Marine Corp for training and operations is located to the west. Across Swan Island Basin to the southwest is the Swan Island Ship Yard.

The City of Portland's storm water outfall M-1 discharges into the Swan Island Basin immediately adjacent to the southeast corner of the FDDS property.

2.2 Site Operations

FDDS provides diving and salvage services to the marine industry. Specialties include heavy and light marine salvage, wreck removal, high capacity and heavy oil pumping, underwater inspections of vessels and structures, underwater repair, environmental dredging and sampling, and receiving and delivery of ship stores. Underwater services include video documentation, welding, cutting, hull cleaning, propeller polishing, environmental surveys and general ship husbandry.

The majority of FDDS' work is conducted offsite (away from the FDDS location); their facility is primarily used for administration and storage and maintenance of company equipment. Table 1

[3] U. S. Geologic Survey, Topographic Map, Portland Quadrangle, 1990.
[4] Information obtained from www.portlandonline.com.

(behind text) summarizes industrial activities and materials at the site and evaluates their potential to impact storm water.

Office. FDDS occupies the second floor of the office building, which is shared by various companies; the first floor is leased to National Response Corporation (NRC). Operations on both floors are administrative. Personnel vehicles are parked on the north and west sides of the office building; the parking lot is asphalt-paved.

Warehouse. FDDS occupies the 1976, 14,000-square foot portion of the warehouse, which is predominantly used for the maintenance and storage of boats and gear used in the diving and marine salvage work. According to the Preliminary Assessment[5] (PA) conducted at the site:

> *Small quantities of motor fuel and lubricating oil, as well as a small self contained parts washer, are located in the eastern section of the warehouse. One approximately 10 feet long and eight inch wide floor drain which is piped to the one on site oil/water separator is located in front of the paint room. According to FDDS, the drain was intentionally plugged inside the structure several years ago.*[6]
>
> *A small paint room is located in the middle of the eastern section of the warehouse. FDDS occasionally cleans and paints small equipment with aerosol paint cans. An eight inch wide floor drain runs about one half the length of the floor in this room. The floor drain is piped to a buried three chamber oil/water separator of approximately 400 gallon capacity. The separator is constructed of metal and was placed below ground in 1977. Discharge water from the oil/water separator is plumbed to the sanitary sewer system. However, according to Mr. Leitz, the discharge line has always been kept closed by a valve thereby isolating the separator. The separator only occasionally receives runoff from the shop and the small paint room. The separator is pumped out and cleaned at least once a year by an outside contractor such as Foss Environmental Services.*
>
> *The western section of the warehouse, which was built in 1995, was specifically constructed for the former Smith Technology Corporation, which went out of business within a year after the building was completed. That section of the warehouse was vacant for several years until FDDS leased it to Atlantic Logistics, Inc. in 2000 for the storage of miscellaneous equipment removed from ships at the Swan Island Ship Yard.*

The western section of the warehouse is 10,500 square feet plus 2,000 square feet of mezzanine office area and is currently tenanted by NRC.

Dock. The dock is primarily used by FDDS for securing their work boats, and barges. The dock is also used by other parties for mooring commercial and private motor and sailing vessels such as the river excursion vessel "Sternwheeler Rose."

The 2001 PA noted:

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[5] Evergreen Environmental Management, Inc. 2001. *Preliminary Assessment for the Fred Devine Diving & Salvage, Co.* June 28.

[6] According to Mr. Leitz the grated floor drain was subsequently filled in place with concrete

A large two level dock which was built in 1984 extends from the property into the Swan Island Lagoon. The east side of the dock is currently used by three motor vessels and a sail boat for moorage. The west side of the dock is used by FDDS for mooring work boats and barges used in their diving and salvage work. Based on site inspections, EEM did not observe any quantities of petroleum products or other hazardous materials stored anywhere on the dock, or on the vessels and barges moored to the dock.

Open Areas. The northwestern end (graveled) and southwest-central (paved) sides of the property are open spaces. The northwestern end is leased and used by Nviro, Inc.[7] and NRC for storage of equipment and materials. FDDS also stores equipment and materials at the far western portion of this area. The southwest-central portion is used by FDDS for vehicle parking, equipment staging and short-term storage of equipment and materials. No activities other than storage are conducted in this area.

Generally, equipment stored in this area consists of support truck and trailers (generally covered or enclosed), rigging and scaffolding (metal and painted metal), and some piping (metal and plastic).

2.3 Previous Investigations

Evergreen Environmental Management, Inc. (EEM) completed a PA[5] in 2001 and an Expanded Preliminary Assessment (XPA)[8] in 2003. Results of this work are summarized herein.

2.3.1 Preliminary Assessment

The PA was conducted for the stated purpose of evaluating the FDDS site for potential environmental risks associated with historical on-site and surrounding land uses and for possible contamination from hazardous substances, wastes, and petroleum product.

After completing field and office research, EEM concluded:

- *Historical information indicates the subject property area was undeveloped until the office building construction in 1973. The subject property area (Mocks Bottom) was created by the placement of dredge spoils by the City of Portland starting in the 1930s.*
- *City of Portland records indicate both buildings were connected to the city's storm and sanitary sewer systems during their initial construction.*
- *Two 2,000 gallon gasoline tanks installed in 1975 and one 4,000 gasoline tank installed in 1979 were removed from the site in 1993. Based on the ODEQ tank decommissioning Change in Service forms completed by the tank decommissioning firm, the tanks had not leaked.*
- *Because of the age of the office structure it is possible that asbestos containing materials may have been used. However, the construction materials in the office building did not appear to be typical of materials that might contain asbestos. All of*

[7] Nviro, Inc. is a sandblasting company. All work performed by Nviro, Inc. is performed offsite, and no sandblast related wastes are stored on the FDDS site.

[8] EEM. 2003. *Revised Sub-Surface Soil & Catch Basin Debris Sampling Report.* March 19.

EVREN NORTHWEST INC
environmental natural resource consultants

Thursday, April 19, 2007

Mark Pugh
ODEQ – NW Region
2020 SW 4th Ave. Suite 400
Portland, OR 97201-4987

RE: The Marine Salvage Constorium, Inc. (DBA Fred Devine Diving & Salvage, Co.)
6211 N Ensign St. Portland, OR 97217

Dear Mark,

Enclosed, please find one (1) copy of our report, entitled "Storm Water Source Control Evaluation Work Plan", for the above listed site address. Should you have any questions or comments, please do not hesitate to phone.

Thank you,

Jenya Lum
EVREN Northwest, Inc.
P. P. Box 80747
Portland, Orgon 97280
503-452-5561
Fax: 503-452-7669

CC: J.A. Leitz
Fred Devine Diving & Salvage, Co.
(2 Copies)

these materials appeared to be in good condition and no obvious exposure hazard was evident. Because of the age and type of construction of the two connected warehouse structures, it is unlikely that asbestos containing materials exist there.

- *Considering the age of the buildings, it is possible that lead based paint has been used on them. However, no indications of the degradation of any paint such as peeling or flaking were observed.*
- *Two pad mounted transformers that serve the subject property are located on site. One has a sticker indicating that it does not contain PCBs (polychlorinated biphenyls). Both transformers appear to be in very good condition and no leaks from them were observed. Both transformers are PGE's responsibility. No other obvious sources of PCBs were observed at the site.*
- *No manufacturing or similar activities have ever occurred at the FDDS site. FDDS uses the upper floor of the office structure for their administrative functions. The ground floor is vacant. The eastern section of the warehouse structure is used by FDDS for storage and maintenance of their diving and salvage gear. The western section of the warehouse is leased to Atlantic Logistics, Inc for the storage of equipment removed from ships.*
- *Two former tenants of the facility conducted offsite response and cleanup work. The former Pacific Coast Environmental occupied part of the FDDS facility from 1989 to 1995. The former Smith Technology Corporation occupied part of the FDDS facility from only 1995 to 1996.*
- *With the exception of two very minor incidents, one in 1995 and the other in 2000, no known or documented releases of petroleum products or other hazardous substances have occurred to exposed soil, on to the pavement, into the catch basins, or into the lagoon at the FDDS site. Both incidents were reported to EPA's Emergency Response Notification System. The 1995 incident apparently involved the accidental loss of some oil stained absorbent pads from a torn garbage bag that fell into the lagoon from the FDDS dock. The materials were quickly retrieved. A small sheen was generated which quickly dispersed. The 2000 incident involved the accidental loss of approximately five gallons of paint into the river apparently from a barge. The spilled fluid was quickly removed.*
- *Based on the FDDS facility's location next to the lagoon, and also apparently based on a comparison of analytical results from one sediment sample (PSY12) collected by EPA next to the FDDS dock to other samples collected in the lagoon and river, EPA and ODEQ consider the subject property a potential source of petroleum and other contamination to the lagoon and river.*
- *After several site inspections and a review of the history of the FDDS and adjoining properties, it is EEM's opinion that the primary and logical sources of any detected contamination in the lagoon sediments adjacent to the FDDS property and in the*

Willamette River are from historical activities at the Swan Island Ship Yard and out flow from the City of Portland's storm water out fall (M-1) located immediately adjacent to the subject property.

- *In regard to potential pathways of contaminants to the lagoon or river from the subject property, EEM believes there are only two direct pathways. These are from the catch basins into the storm sewer system, and from spills or releases from vessels tied up to the FDDS dock. Both potential pathways have been and are closely monitored and managed to prevent any petroleum or other contaminants from impacting the lagoon or river.*
- *ODEQ has requested that FDDS generate a Scope of Work for the collection of site characterization soil, sediment and/or groundwater samples based on the determination of potential contaminant pathways to the lagoon and river. Based on a review of the current and historical uses of the FDDS property, EEM firmly believes that the subject property has not been nor is a source of petroleum hydrocarbon or other types of contamination to the sediments in the lagoon or river. Therefore, EEM does not recommend that any type of intrusive sampling be conducted at the site. Please refer to Sections 8.0 and 9.0 for text regarding this subject.*

2.3.2 Expanded Preliminary Assessment

The XPA was conducted to: determine the types of contaminants present at the site and compare to these to river sediment contaminants previously detected at elevated levels; evaluate pathways through which contaminants could reach the river; and identify potential storm water contaminant sources on which to focus BMPs to eliminate or reduce potential impacts to storm water discharge. The XPA included catch basin sediment and surface soil sampling and analysis. A total of eight samples were collected: one from each of the four catch basins (sediment samples) and four from locations in the western graveled portion of the FDDS property (soil samples). All eight samples were analyzed for total arsenic, cadmium, copper, lead and zinc, as well as semi-volatile organic constituents (SVOCs) and polychlorinated biphenyls (PCBs).

According to the ODEQ website[9], elevated levels of phthalates and polynuclear aromatic hydrocarbons (PAHs) were detected in the sediment samples. The XPA explains that elevated levels of oil-range petroleum hydrocarbons in the four sediment samples raised the method detection limits (MDLs) for some of the PCBs and volatile organic constituent (VOC) analyses. XPA sampling data is further evaluated in Sections 4.0 and 5.0 of this report according to current screening criteria.

2.3.3 Further Investigation Regarding Impacts of Phthalate Esters in Catch Basin Sediment

EEM conducted additional investigation regarding impacts of phthalate esters to catch basin sediment. During the XPA sampling event, packing materials (styrofoam 'peanuts') were observed in the landscaped areas of the property and in several of the catch basins. The source of the

[9] http://www.deq.state.or.us/wmc/ECSI/ecsidetailfull.asp?seqnbr=2365

packing 'peanuts' appears to be the UPS facility located to the north. A sample of the packing 'peanuts' was collected on September 20, 2006, and analyzed for phthalate esters. Laboratory results indicated the presence to two (2) phthalate esters, bis(2-ethylhexyl)phthalate at up to 0.650 milligrams per Kilograms (mg/Kg), and butyl benzyl phthalate, at up to 5.7 mg/Kg. This data shows that potential impacts of phthalate esters at the subject property may be due to impacts of packing 'peanuts' from an offsite source.

3.0 FACILITY STORM WATER

3.1 Site Drainage

The majority of the impervious surfaces on the site's central and eastern sides drain to six catch basins spaced relatively evenly through the paved areas (see Figure 4, Site Storm Water Map). These six catch basins each drain independently to a common storm water sewer that outfalls to the southeast, where storm water enters the City of Portland's storm sewer system which drains southwest to the Swan Island Basin at City of Portland outfall M-1.

Storm water falling on the warehouse's metal roof drains to the asphalt pavement and subsequently to one of the catch basins. The metal roof has been painted; therefore the roof is not expected to contribute metals to the storm water.

Storm water falling on the western graveled portion of the site ponds and infiltrates.

3.2 Catch Basins

Each catch basin was approximately two feet in diameter and about two and a half feet deep. No solids were visibly evident during the most recent site inspection. The water outlet is inverted (22 inches from the top); therefore providing settling depth for solids to accumulated in the sump of the catch basin, as well as the ability to separate floating materials, including floating oil and grease from the discharge.

3.3 Historical Storm Water Sampling Results

In February 2001 the BES collected a storm water sample from discharge entering the storm water manhole located in the site entrance driveway. (Discharge from this location was considered representative of storm water leaving the site and entering the city's storm sewer line.) The sample was submitted for analyses consistent with an NPDES permit.

Based on information from the XPA, no petroleum hydrocarbons were detected and the only constituent outside of the benchmarks was pH, which was slightly low.

3.4 Current Site Storm Water Controls

This section describes current control measures and BMPs implemented at the site to reduce storm water contamination. It also describes items that are in process of being implemented.

SWPCP: ENW will be working with FDDS to develop and implement a storm water pollution control plan (SWPCP) based on the format required by NPDES permits. The rest of these items will be included in the SWPCP.

Employee Education: An employee education program is ongoing consisting of spill prevention and cleanup; however additional emphasis on potential storm water impacts will be implemented consistent with the SWPCP.

Spill Response: As part of the employee education program, personnel working on the dock, in the warehouse or in the yards will be trained in spill response. Spill response kits will be developed and maintained in easy-to-access locations, as appropriate. Tenant's working on-site outside of the office will also be required to receive spill response training.

Stenciling: The message "Dump No Waste, Drains to Willamette River" has been stenciled next to each of the catch basins.

Sign Posting: Signs will be posted in the office parking lot and around the paved space between the warehouse and the dock indicating that vehicles and equipment are not to be washed in areas that drain to the catch basins.

Debris Removal: A regular program of catch basin and storm water conveyance system cleaning has been implemented (see Appendix A for documentation). FDDS conducts this work, or contracts with a company knowledgeable in storm water system cleaning, such as NRC, to conduct this work in accordance with BES protocol (Appendix B). At a minimum, the catch basins are cleaned before the depth of solids reaches one-third the depth from the basin bottom to the invert of the lowest pipe into or out of the basin.

In between cleanings the catch basins are inspected regularly and any leaves and trash are promptly removed.

Exposure Reduction: As shown in Table 1, on-site activities involving materials with any significant potential to impact storm water are conducted inside the warehouse (under cover). If any equipment or materials with the potential to impact storm water is staged or stored short-term in open areas, these items will be covered during precipitation events.

Settling: The six catch basins are designed to trap and settle out particles (sediment). Frequent removal of this sediment keeps any contaminants in the sediment from leaving the site with storm water.

Oil & Grease Reduction: Absorbent booms were maintained in the catch basins to reduce the amount of any oil and grease in storm water. This practice was terminated after determining that the absorbent booms have the potential to introduce phthalate esters into the stormwater. However, the design of the catch basins (storm water is discharged through inverted outlets) traps phase-separated (floating) oil and grease in the catch basin.

4.0 SEDIMENT SCREENING

Catch basin sediment screening is intended to precede storm water screening, so that analytical results from the catch basin sediment screening can be used to help develop and refine the site-specific storm water analytical suite.[10]

4.1 COIs in Sediment adjacent to City of Portland Storm Water Outfall M-1

Recent work by others[2] evaluates the results of sampling of sediment adjacent to the City of Portland storm water outfall M-1 and identifies constituents of interest (COIs) in sediment at that location. A summary table of this work is included as Table 2. This information is important and relevant to the FDDS site as it provides a first step in narrowing down site-specific COIs.

4.2 COIs in Catch Basin Sediment

Catch basin sediment sampling was conducted on April 30, 2002, by EEM as part of the XPA. Table 2 (behind text) presents and screens this event's analytical results against the lowest screening level value (SLV) from the JSCS. Generally accepted and achievable laboratory detection limits prepared by the Lower Willamette Group are also presented in Table 2 for each constituent.

The XPA provides the following information regarding the catch basin sediment sampling event:

- Sediment from four of the total six catch basins on-site was sampled and analyzed. Sediment from Catch Basins #2 and #5 were not sampled (see Figure 4 for locations).
- From the XPA: *Each catch basin was approximately two feet two inches wide and two feet nine inches deep and had approximately one to two inches of solid material on the bottom. The solid material was predominantly organic debris such as leaves, grasses, etc. The water outlet take in each basin is approximately 22 inches from the top.*
- The most recent catch-basin cleaning had occurred nine months prior to the sampling event (conducted in October 2001).
- An occasional very slight sheen was observed during the removal of standing water from the catch basins adjacent to the warehouse and dock entrance. Material in these catch basins appeared to be comprised of dirt and decaying organic debris.
- The material in the bottom of Catch Basin #6, adjacent to the office, was almost all organic debris from the numerous trees and bushes in that area.
- No materials such as paint chips were observed in any of the catch basins.
- After sampling the catch basins were cleaned and absorbent booms were replaced with new ones.

[10] Appendix D of the JSCS.

The XPA also discusses the sampling results. Of note is the fact that some laboratory detection limits were elevated due to the presence of "significant heavy hydrocarbons in the oil range".

The rest of this section evaluates and discusses the catch basin sediment sampling screening results shown in Table 2. ***During this evaluation it is important to understand that the JSCS SLVs are not cleanup concentrations or indications of unacceptable risk, rather they are used to indicate the need for further consideration of source control using a weight-of-evidence evaluation.***

Table 4-1, below, evaluates the existing catch basin sediment analytical data from Table 2 (behind text) and considers site-relevancy by analytical group to identify COIs.

Table 4-1. Catch Basin Sediment COI Screening

Analytical Group[11]	Analyzed?	Were SLVs exceeded?	Comments
Metals	YES, selected: As, Cd, Cu, Pb and Zn	**Yes**: Cd, Cu, Pb and Zn	Arsenic detected below SLV.
Butyltins	No	—	Not identified as COIs at M-1.
PCBs Arochlors	YES	**No PCBs were detected**, but the MRL (method reporting limit) exceeded individual PCB SLVs where established.	There are no known or suspected sources of PCBs at the site.
Chlorinated Herbicides	No	—	Not used or manufactured on-site. Not identified as COIs at M-1.
Organochlorine Pesticides	No	—	Not used or manufactured on-site
VOCs	No	—	Not identified as COIs at M-1.
SVOCs		**None detected.** In general, MRLs exceed established SLVs and the generally accepted and achievable MRLs from the Lower Willamette Group.	—
Organonitrogen Compounds	YES	**None detected**. MRLs exceed established SLVs and the generally accepted and achievable MRLs from the Lower Willamette Group.	Not identified as COIs at M-1.
Oxygen-Containing Compounds	YES	**None detected**. No SLVs established. MRLs exceed the generally accepted and achievable MRLs from the Lower Willamette Group.	Not identified as COIs at M-1.
Phenols and Substituted Phenols	YES	**None detected**. MRLs exceed the SLVs and the generally accepted and achievable MRLs from the Lower Willamette Group.	Not identified as COIs at M-1.
Phthalate Esters	YES	Bis[2-ethlhexyl]phthalate was detected above the SLV. Other phthalates were non-detect, but the MRL exceeds the SLV.	—
PAHs	YES	Five PAHs were detected above SLVs. Other PAHs were non-detect, but the MRL exceeds the SLV.	—
Chlorinated Dioxins and Furans	No	—	Not identified as COIs at M-1.

Table 4-1 shows that certain metals, PAHs, and a phthalate were detected above SLVs in the sediment collected from catch basins at the site. Based on the results and logic presented in Table 4-1 and the activities and materials present on-site with the potential to impact storm water (see

[11] Analytical Groups mirror those shown by Table 3-1 of the JSCS.

Table 1), the site-specific COIs for sediment and storm water (see Tables 4 and 5) should be consistent with the analyses required by the ODEQ[1]:

- Selected metals: cadmium, chromium, copper, lead and zinc
- Total petroleum hydrocarbon (diesel and residual-range organics)
- SVOCs
- PAHs
- Phthalates

In addition, the ODEQ is requesting all parties performing a SCE to analyze sediment and storm water samples for PCBs and phthalate esters, and also perform grain-size analysis on sediment and total suspended solid (TSS) analysis on storm water. As indicated in their letter, ODEQ has requested FDDS resample the catch basin sediment due to the relatively high laboratory detection limits that accompanied the 2002 sample event.

Sampling protocol and analytical methods are further discussed in Section 6.0.

5.0 STORM WATER SCREENING

A detailed description of site storm water is presented in Section 3.0. Table 1 (behind text) presents an analysis of the potential for site activities and materials to impact storm water. In brief, storm water is conveyed to one of the six catch basins and discharged to the city storm sewer where it commingles with storm water from up-pipe sources and ultimately discharges to the Swan Island Basin via the City of Portland outfall M-1. Based on the fact that only limited storm water sampling data is available, the site-specific COIs for storm water are identified consistent with sediment COIs, as described in Section 4.2.

6.0 SCOPE OF WORK

Catch basin sediment and storm water will be collected and analyzed, as described in this section, to evaluate the potential for site-related contaminants to impact the Willamette River via the City of Portland storm sewer line.

6.1 Catch Basin Sediment Sampling and Analysis

Catch basin sediments represent a time-integrated snapshot of potential sediment discharge to the river. If the first round of catch basin sediment sampling indicates JSCS SLV exceedances, additional sampling events may be performed to assess sediment quality variability, source identification, or to assess BMP or corrective action effectiveness.

6.1.1 Sediment Sampling Locations

Sediment sampling is proposed from two of the six catch basins that outfall to the City's municipal drainage. The two catch basins will be chosen using a random number generator.

However, sediment in all six catch basins will be qualitatively evaluated during the sampling event to record depth of sedimentation, and describe color, odor, presence of accumulated storm water, and presence of sheen and debris (settled and floating).

6.1.2 Sediment Sample Collection

Sediment samples will be collected according to City of Portland's: *Standard Operating Procedures, Guidance for Sampling of Catch Basin Solids*[12]. This document is included as Appendix C. Sediment samples will be analyzed according to the analytical plan presented in Table 6-1. Data quality objectives are presented in Table 3 (after text).

[12] CH2M Hill. 2003. *Standard Operating Procedures, Guidance for Sampling Catch Basin Solids.* Prepared for the City of Portland. July.

Table 6-1. Sediment Sampling Analytical Plan

COIs	Analytical Method	Sample Container	Preservative and Handling	Hold Time	Special Handling (if applicable)
Metals (Cd, Cr, Cu, Pb, Ni and Zn)	EPA Method 6020	Clear 8 oz. glass	Cool to 4°C	Six months	—
DRO (diesel-range organics) and RRO (residual-range organics)	NWTPH-Dx	Clear 8 oz. glass	Cool to 4°C	14 days	—
SVOCs	EPA Method 8270c	Clear 8 oz. glass	Cool to 4°C	14 days until extraction; 40 days after extraction	—
PAHs	EPA Method 8270SIM	Clear 8 oz. glass	Cool to 4°C	14 days until extraction; 40 days after extraction	—
Phthalates	EPA Method 8270SIM	Clear 8 oz. glass	Cool to 4°C	14 days until extraction; 40 days after extraction	—
PCBs	EPA Method 8082	Clear 8 oz. glass	Cool to 4°C	14 days until extraction; 40 days after extraction	—
Grain-Size	ASTM D422	Polycarbonate tube with end caps or plastic bag	NA	NA	—

ENW will attempt to achieve MDLs that are less than the JSCS SLVs for sediment (see Table 4); if the MDLs are not analytically achievable, ENW will document the alternative Practical Quantification Limit, as set forth in Section 3.3 of the JSCS.

6.2 Storm Water Sampling and Analyses

As recommended by the JSCS, four "grab sample" storm water sampling events to be conducted over one year are proposed. Two of these sampling events should be representative of "first flush" conditions (i.e., within the first 30 minutes of storm water discharge); the remaining two should be conducted within the first three hours of storm water discharge, to the extent practicable.

6.2.1 Storm Water Sampling Location

The storm water grab sample will be collected from storm water discharging from a manhole located between catch Basin #5 and #6, prior to it entering the City of Portland storm sewer line. It

is believed that this location will be most representative of storm water discharge leaving the site and entering the City of Portland storm sewer line.

6.2.2 Storm Event Criteria and Selection

As required by the JSCS, the following criteria will be employed in the selection of storm events during which storm water samples will be collected.

- Antecedent dry period of at least 24 hours (as defined by <0.1-inches of precipitation over the previous 24 hours)
- Minimum predicted rainfall volume of >0.2-inches per storm event
- Expected duration of storm event of at least 3 hours

The antecedent dry period may be evaluated using Swan Island-specific rain gauge data at the following web address: http://or.water.usgs.gov/non-usgs/bes/raingage_info/clickmap.html Select station number 122, which corresponds to a rain gauge located at 2600 N. Going Street.

When selecting the timing of sampling, consideration should be given to seasonal or operational variations (e.g., equipment and truck use, product storage, etc.) at the facility to assure representative samples are collected.

6.2.3 Storm Sample Collection

Each storm water grab sample will be collected according to the analytical plan shown in Table 6-2. This plan details the COIs, the specified analytical methods, appropriate sample containers, preservatives and hold times, as well as any special requirements for obtaining the lowest method detection limit possible. Data quality objectives are presented in Table 3 (after text).

Table 6-2. Storm Water Sampling Analytical Plan

COIs	Analytical Method	Sample Container	Preservative and Handling	Hold Time	Special Handling (if applicable)
Metals (Cd, Cr, Cu, Pb, Ni and Zn)	EPA Method 200.8/6020	500-ml HDPE	Nitric Acid; Cool to 4°C	Six months	
DRO (diesel-range organics) and RRO (residual-range organics)	NWTPH-Dx	1-Liter amber glass	Hydrochloric Acid; Cool to 4°C	14 days	
SVOCs	EPA Method 8270c	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction	
PAHs	EPA Method 8270SIM	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction	—
Phthalates	EPA Method 8270SIM	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction	
PCBs	EPA Method 8082	1-Liter amber glass	Cool to 4°C	7 days until extraction; 40 days after extraction	—
Total Suspended Solids (TSS)	EPA Method 160.2	10Liter polyethylene	Cool to 4°C	7 days	

ENW will attempt to achieve MDLs that are less than the JSCS SLVs for storm water (see Table 5); if the MDLs are not analytically achievable, ENW will document the alternative Practical Quantification Limit, as set forth in Section 3.3 of the JSCS.

Grab samples will be collected as described in the storm water sampling guide[13] included in Appendix D of the JSCS. Grab samples will be collected directly into laboratory-supplied bottles. The bottles will be held with their openings facing upstream. Care will be taken to avoid contaminating the sample by touching the opening of the container and ensuring that the storm water enters the bottle directly[14]. For a well-mixed, representative sample, the samples will be taken from the central portion of the storm-water flow and where there is a moderate flow and some turbulence. Bottles will not be overfilled and will be capped as soon as they are full. Field

[13] Ecology. 2002. How to do stormwater sampling, a guide for industrial facilities. Washington Department of Ecology. December (revised January 2005).

[14] Certain laboratory analyses, such as oil and grease, require grab samples be collected directly into sample bottles to ensure that the sample is not compromised during material transfer.

parameters (pH, specific conductance, temperature and turbidity) will be measured during sample collection.

6.3 Field Documentation

The JSCS requires comprehensive field documentation be made to aid in the interpretation of analytical results. For storm water and sediment sampling, field documentation, at a minimum, should include a description of the weather – what time rainfall began and when runoff was first observed at the sampling location. Sample collection information, such as how the sample was collected and any problems that occurred during collection, visual sample observations, and any other unusual circumstances that may affect the analytical results should all be noted. All field measurements, including depth of sedimentation, color, odor, texture, pH, temperature, and conductivity, should also be recorded on the field data sheets.

After a storm water sampling event, rainfall and weather information should be documented along with the field data sheets. This information may be included in the sampling report.

6.4 Sample Transport and COC Procedures

After sediment and/or storm water samples have been collected, they will be placed in a cooler with chilling material (ice or equivalent) and transported to the analytical laboratory. Chain-of-custody (COC) procedures will begin in the field and will track delivery of the samples to the laboratory. Specific procedures are as follows:

- Individual sample containers will be packed to prevent breakage and leakage.
- COC forms will be placed in a sealed plastic bag and inside the cooler
- Signed and dated COC seals will be used to secure all coolers before shipping.

Upon transfer of samples to the laboratory, the COC form will be signed by the persons transferring custody of the coolers. Upon receipt of samples by the laboratory, the shipping-container seal will be broken and the condition of the samples will be recorded by the receiver.

6.5 Data Quality Assurance and Control

Data will undergo a quality assurance review consistent with EPA protocol.[15],[16] Sediment and storm water data will be compared with the JSCS SLVs.[17]

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[15] EPA. 1994. USEPA contract laboratory program, national functional guidelines for inorganics data review. USEPA/540/R-94/013. EPA Office of Emergency and Remedial Response. February.

[16] EPA. 1999. USEPA contract laboratory program, national functional guidelines for organics data review. USEPA/540/R-99/008. EPA Office of Emergency and Remedial Response. October.

[17] See Table 3-1 of the JSCS; check ODEQ website for updates prior to each review.

6.6 Work Schedule

Catch basin sediment and storm water sampling will be conducted as soon as practical following ODEQ approval of this Work Plan. After catch basin sediment sampling has been conducted, the storm water conveyance system will be cleaned as discussed in Section 3.4.

7.0 REPORTING

After receipt of sample results from each sampling event a brief technical memorandum will be prepared comparing the results to the appropriate JSCS criteria and discussing results. Depending on the results, additional source control measures may be recommended for implementation at the site.

The following elements, as required by JSCS will be incorporated into each sampling event submittal:

- For sediment sampling, field documentation and background information, including documentation of precipitation totals preceding and during sample collection, as well as any field notes generated during the sampling event.
- For storm water sampling, an evaluation of resultant rainfall volume and distribution to see if they met required storm event criteria.
- Copies of original laboratory reports and chain-of-custody documentation.
- Tabulated laboratory results, submitted both in paper and electronic format, that identifies sampling location(s), unit(s) of measurement, compounds detected, MDLs and SLVs. Compounds detected will be bolded and compounds exceeding SLVs will be shaded for easy reference.
- A summary of screening results which includes a discussion of compounds detected, compounds detected above SLVs, magnitude of the exceedance and a list of any persistent bioaccumulative and toxic chemicals detected.
- An evaluation of analytical data in the context of the hydrological conditions that preceded the storm event, as well as those that existed at the time of sample collection.

Table 1 - Summary of Site Activities

Activity	Potential Pollutants	Potential to Impact Storm Water	Source Control Measures
Office Area - *including associated paved parking lot*			
Personnel parking	Oil & grease, TSS	Small amount of oil, grease and TSS is expected. A larger potential is present if personnel vehicles are not in good repair.	Educate personnel parking in lot on the potential to impact storm water. Use drip pans for vehicles with known leaks.
Thru-traffic	Oil & grease, TSS	Small amount of oil, grease and TSS is expected.	—
Landscaping	Oil & grease, TSS, fertilizers and weed-killers	Small amount of TSS is expected from erosion; however fertilizers and weed-killers are not used	
Warehouse - *eastern, FDDS-occupied portion*			
Welding	Metals, TSS, oil & grease	Unlikely since drains in building no longer drain to storm system (plugged)	—
Equipment cleaning	Oil and grease, solvents, metals		—
Storage	Solvents, metals, TSS, oil and grease		—
Central Open Space - *asphalt-paved area between warehouse and dock*			
Material and equipment staging	*Oil & grease, TSS*	Small amount of oil, grease and TSS is expected. *A larger potential is present if equipment are not in* good repair.	Educate personnel on the potential to impact *storm water. Use drip pans for equipment with* known leaks.
Thru-traffic	Oil & grease, TSS	Small amount of oil, grease and TSS is expected.	—
Vehicle & equipment parking	Oil & grease, TSS	Small amount of oil, grease and TSS is expected. A larger potential is present if vehicles or equipment are not in good repair.	Educate personnel on the potential to impact storm water. Use drip pans for vehicles and equipment with known leaks.
Short-term storage	Oil & grease, TSS	Small amount of oil, grease and TSS is expected. A larger potential is present if equipment are not in good repair.	Educate personnel on the potential to impact storm water. Use drip pans for equipment with known leaks.
Dock			
FDDS and private party ship docking	—		
Routine vessel maintenance	Oil & grease, TSS	Small amount of oil and grease is expected.	Educate personnel on the potential to impact storm water. Use drip pans or other containers or adsorbent pads to capture potential waste products during maintenance activities.
Transportation of materials on and off vessels	Oil & grease, TSS	Small amount of oil, grease and TSS is expected. A larger potential is present if equipment or materials are not in good repair.	Educate personnel on the potential to impact storm water. Do not move equipment or materials that have a potential to leak. Use secondary containment if necessary.
Warehouse - *western, NRC-occupied portion*			
Storage	—	Unlikely since storage in covered area with no contact with storm water	—
Western Open Space - graveled area leased and used by FDDS, Nviro, Inc. and NRC			
Material and equipment staging	Oil & grease, metals, TSS	Small amount of oil, grease, metals and TSS is expected. A larger potential is present if equipment are not in good repair.	Educate personnel on the potential to impact storm water. Use drip pans for equipment with known leaks.
Thru-traffic	Oil & grease, TSS	Small amount of oil, grease and TSS is expected.	—
Vehicle & equipment parking	Oil & grease, TSS	Small amount of oil, grease and TSS is expected. A larger potential is present if vehicles or equipment are not in good repair.	Educate personnel on the potential to impact storm water. Use drip pans for vehicles and equipment with known leaks.
Short-term storage	Oil & grease, TSS	Small amount of oil, grease and TSS is expected. A larger potential is present if equipment are not in good repair.	Educate personnel on the potential to impact storm water. Use drip pans for equipment with known leaks.

Table 2 - Summary of Analytical Data, Sediment

Location ID	Catch Basin # 1	Catch Basin # 2	Catch Basin # 3	Catch Basin # 4	Catch Basin # 5	Catch Basin # 6	Maximum Sediment Concentration	Lowest JSCS Screening Level	COPC*	[illegible] Acceptable and Achievable Laboratory Detection Limits prepared by the [illegible]			
Sample ID	CB-1	CB-2	CB-3	CB-4	CB-5	CB-6							
Date Sampled	4/30/2002	4/30/2002	4/30/2002	4/30/2002	4/30/2002	4/30/2002							
Depth Sampled (feet)	NA	NA	NA	NA	NA	NA							
Sample By	Evergreen	Evergreen	Evergreen	Evergreen	Evergreen	Evergreen							
Location	Catch Basin # 1	Catch Basin # 2	Catch Basin # 3	Catch Basin # 4	Catch Basin # 5	Catch Basin # 6							
Constituent of Interest	mg/Kg (ppm)						mg/Kg (ppm)	mg/Kg (ppm)	Y / N	ACG	MDL	MRL	PQL
Semi-Volatile Organic Constituents (SVOCs)													
Haogenated Compounds													
Dichlorobenzene, 1,2-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.7	(Y)	0.384	tbd	0.02	NE
Dichlorobenzene, 1,3-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	NE	tbd	0.02	NE
Dichlorobenzene, 1,4-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	0.062	tbd	0.02	NE
Trichlorobenzene, 1,2,4-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.2	N	NE	tbd	0.02	NE
Hexachlorobenzene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.0006	tbd	0.01	NE
2-Chloronaphthalene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
Hexachloroethane	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.002	tbd	0.006	NE
Hexachlorobutadiene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.6	(Y)	0.0006	tbd	0.01	NE
Hexachlorocyclopentadiene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.4	(Y)	NE	tbd	0.1	NE
2,2'-oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	NE	tbd	0.02	NE
Bis-(2-chloroethoxy) methane	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
Bis-(2-chloroethyl) ether	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.04	NE
4-Chlorophenyl-phenyl ether	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
4-bromophenyl-phenyl ether	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
3-3'-Dichlorbenzidine	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	NE	tbd	0.1	NE
4-Chloroaniline	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	NE	tbd	tbd	NE
Organonitogen Compounds													
Nitrobenzene	NA	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
Aniline	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
2-Nitroaniline	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.03	NE
3-Nitroaniline	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.12	NE
4-Nitroaniline	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.06	NE
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	0.0000073	tbd	0.1	NE
N-Nitroso-di-n-propylamine	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.000063	tbd	0.02	NE
N-Nitrosodiphenylamine	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
2,4-Dinitrotoluene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.1	NE
2,6-Dinitrotoluene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.1	NE
Carbazole	<13.4 (ND)	NA	<13.4 (ND)	<13.4 (ND)	NA	<13.4 (ND)	<13.4 (ND)	1.6	(Y)	0.12	tbd	0.006	NE
Oxygen-Containing Compounds													
Benzoic Acid	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	NE	tbd	0.2	NE
Benzyl Alcohol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
Dibenzofuran	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.0062	tbd	0.005	NE
Isophorone	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
Phenols and Substituted Phenols													
Phenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0	(Y)	3.146	tbd	0.02	NE
2-Methylphenol (o-Cresol)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
4-Methylphenol (o-Cresol)	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	0.028	tbd	0.02	NE
2,4-Dimethylphenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.02	NE
2-Chlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.028	tbd	0.02	NE
2,4-Dichlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.016	tbd	0.06	NE
2,4,5-Trichlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.624	tbd	0.1	NE
2,4,6-Trichlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.0018	tbd	0.1	NE
2,3,4,6-Tetrachlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.157	tbd	0.1	NE
Pentachlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.0	(Y)	0.00068	tbd	0.034	NE
4-Chloro-3-methylphenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.04	NE
2-Nitrophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.1	NE
4-Nitrophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.1	NE
2,4-Dinitrophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	NE	tbd	0.23	NE
Phthalate Esters													
Dimethylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	20	tbd	0.021	0.01
Diethylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.6	(Y)	NE	tbd	0.02	0.01
Di-n-butylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.204	tbd	0.02	0.02
Butylbenzylphthalate	<6.7 (ND)	NA	<6.7 (ND)	27.2	NA	<6.7 (ND)	27.2	NE	N	8.4	tbd	0.02	0.01
Di-n-octylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.0408	tbd	0.02	0.02
Bis(2-ethylhexyl)phthalate	**27.8**	NA	**172**	**18.7**	NA	<6.7 (ND)	172	0.33	Y	0.0004	tbd	0.02	0.02
Polyaromatic Hydrocarbons													
Naphthalene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.561	(Y)	0.024	tbd	0.02	0.002
2-Methylnaphthalene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.2	(Y)	NE	tbd	0.02	0.002
Acenaphthylene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.2	(Y)	NE	tbd	0.03	0.002
Acenaphthene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	0.072	tbd	0.03	0.002
Fluorene	<6.7 (ND)	NA	<6.7 (ND)	6.73	NA	<6.7 (ND)	6.73	0.536	(Y)	0.048	tbd	0.03	0.002
Phenanthrene	<6.7 (ND)	NA	**12.1**	**20**	NA	<6.7 (ND)	20	1.17	Y	NE	tbd	0.02	0.002
Anthracene	<6.7 (ND)	NA	<6.7 (ND)	16.7	NA	<6.7 (ND)	16.7	0.845	(Y)	0.36	tbd	0.001	0.002
Fluoranthene	<6.7 (ND)	NA	**16.3**	**18.7**	NA	<6.7 (ND)	18.7	2.23	Y	0.648	tbd	0.02	0.002
Pyrene	<6.7 (ND)	NA	**8.9**	**12.5**	NA	<6.7 (ND)	12.5	1.52	Y	0.038	tbd	0.02	0.002
Benzo[a]anthracene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.05	(Y)	0.000038	tbd	0.005	0.002
Chrysene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.29	(Y)	0.0036	tbd	0.005	0.002
Benzo[b]fluoranthene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NE	N	0.000038	tbd	0.005	0.004
Benzo[k]fluoranthene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	13	N	0.00038	tbd	0.005	0.004
Benzo[a]pyrene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.45	(Y)	0.0000038	tbd	0.005	0.002
Indeno[1,2,3-cd]pyrene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.000038	tbd	0.005	0.002
Dibenz[a,h]anthracene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.3	(Y)	0.0000038	tbd	0.005	0.002
Benzo[g,h,i]perylene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	NE	tbd	0.005	0.002
Chlorinated Dioxins and Furans													
TCDD, 2,3,7,8- (Dioxin)	NA	NA	NA	NA	NA	NA	0.0E+00	8.5 E-10	N	0.0000001	0.000026	0.0002	NE
Polychlorinated Biphenyls (PCBs)													
Aroclor 1016	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.42	(Y)	NE	tbd	0.004	0.01
Aroclor 1221	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	NE	N	NE	tbd	0.004	0.01
Aroclor 1232	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	NE	N	NE	tbd	0.004	0.01
Aroclor 1242	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.002	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1248	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.004	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1254	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.01	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1260	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.2	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1262	NA	NA	NA	NA	NA	NA	0.0E+00	NE	N	NE	tbd	0.004	NE
Aroclor 1268	NA	NA	NA	NA	NA	NA	0.0E+00	NE	N	NE	tbd	0.004	NE
Total PCBs	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.676	N	NE	NE	NE	NE
Metals													
Aluminum	NA	NA	NA	NA	NA	NA	0	NE	N	NE	2	2	NE
Antimony	NA	NA	NA	NA	NA	NA	0	10	N	NE	0.02	0.05	NE
Arsenic	16.7	NA	5.98	9.05	NA	2.71	16.7	33	N	NE	0.06	0.5	NE
Arsenic III	NA	NA	NA	NA	NA	NA	0	4	N	NE	NE	NE	NE
Cadmium	**2.25**	NA	**2.75**	**3.47**	NA	<1 (ND)	3.47	0.003	Y	NE	0.006	0.02	NE
Chromium (total)	NA	NA	NA	NA	NA	NA	0	111	N	NE	0.04	0.2	NE
Chromium (VI)	NA	NA	NA	NA	NA	NA	0	NE	N	NE	0.4	0.5	NE
Copper	**206**	NA	**172**	**202**	NA	**85.5**	206	10	Y	NE	0.07	0.1	NE
Lead	**226**	NA	**176**	**293**	NA	66.6	293	128	Y	NE	0.02	0.05	NE
Manganese	NA	NA	NA	NA	NA	NA	0	1,100	N	NE	NE	NE	NE
Mercury	NA	NA	NA	NA	NA	NA	0	1.06	N	NE	0.01	0.02	NE
Methyl Mercury	NA	NA	NA	NA	NA	NA	0	NE	N	NE	NE	NE	NE
Nickel	NA	NA	NA	NA	NA	NA	0	48.6	N	NE	0.03	0.2	NE
Selenium	NA	NA	NA	NA	NA	NA	0	0.1	N	NE	0.05	0.1	NE
Silver	NA	NA	NA	NA	NA	NA	0	5	N	NE	0.2	0.2	NE
Zinc	**447**	NA	**265**	**488**	NA	**236**	488	3	Y	NE	0.1	0.5	NE
Perchlorate	NA	NA	NA	NA	NA	NA	0	NE	N	NE	NE	NE	NE
Cyanide	NA	NA	NA	NA	NA	NA	0	NE	N	NE	NE	NE	NE
Total Petroleum Hydrocarbons													
DRO	NA	NA	NA	NA	NA	NA	0	?	N	NE	7.1	25	NE
RRO	NA	NA	NA	NA	NA	NA	<0 (ND)	?	N	NE	4.6	100	NE

Notes:

NP = not present based on NWTPH-HCID (hydrocarbon identification) analysis
ND = not detected at or above laboratory method reporting limits
— = not analyzed or not applicable.
NE = not established
mk/Kg = milligrams per kilogram
DRO = diesel-range organics.
RRO = residual-range organics.
JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005
Bolded concentrations exceed JSCS screening levels (indicated with a Y)
(Y) indicates analyte not detected, but detection limit is above screening concentration.

* Portland Harbor RI/FS, June 24, 2004, Table A6-2.
Analytes, Analytical Concentration Goals and Method
Reporting Limits for Sediment Samples

ACG = Analytical Concentration Goals
MDL = Method Detection Limit
MRL = Method Reporting Limit
PQL = Practible Quanitation Limit
tbd = to be determined

Table 3 - Data Quality Objectives

Analysis	Accuracy	Precision	Completeness	Method	Reference
Storm Water					
Total Metals Method 6020	±25%	±25%	95%	Digestion—ICP/MS	SW-846
Phthalates and PAHs Method 8270	—	—	95%	Extraction—GC/MS - SIM	SW-846
PCBs Method 8082	±25%	±25%	95%	Extraction—GC	SW-846
SVOCs Method 8270	±25%	±25%	95%	Extraction—GC/MS - SIM	SW-846
DRO and RRO Method NWTPH-Dx	±50%	±20%	95%	Extraction—GC	NWTPH-Dx
Sediment					
Total Metals Method 6020	±25%	±25%	95%	Digestion—ICP/MS	SW-846
Phthalates and PAHs Method 8270	—	—	95%	Extraction—GC/MS - SIM	SW-846
PCBs Method 8082	±25%	±25%	95%	Extraction—GC	SW-846
SVOCs Method 8270	±25%	±25%	95%	Extraction—GC/MS - SIM	SW-846
DRO and RRO Method NWTPH-Dx	61% - 140%	±20%	95%	Extraction—GC	NWTPH-Dx

Note:
Phthalates and PAHs: quality assurance/quality control limits for recovery and relative percent difference vary for each analyte and are specified in SW-846 for each analytical method.

Table 4 - COPCs, Method Detection Limits and Screening Levels for Sediment

Location ID	Catch Basin # 1	Catch Basin # 2	Catch Basin # 3	Catch Basin # 4	Catch Basin # 5	Catch Basin # 6	Maximum Sediment Concentration	Lowest JSCS Screening Level	COPC?	General Analytical and Achievable Laboratory Detection Limits prepared by the Lower Willamette Group (all in mg/Kg)			
Sample ID	CB-1	CB-2	CB-3	CB-4	CB-5	CB-6							
Date Sampled	4/30/2002	4/30/2002	4/30/2002	4/30/2002	4/30/2002	4/30/2002							
Depth Sampled (feet)	NA	NA	NA	NA	NA	NA							
Sample By	Evergreen	Evergreen	Evergreen	Evergreen	Evergreen	Evergreen							
Location	Catch Basin # 1	Catch Basin # 2	Catch Basin # 3	Catch Basin # 4	Catch Basin # 5	Catch Basin # 6							
Constituent of Interest	mg/Kg (ppm)						mg/Kg (ppm)	mg/Kg (ppm)	Y / N	ACG	MDL	MRL	PQL
Semi-Volatile Organic Constituents (SVOCs)													
Haogenated Compounds													
Dichlorobenzene, 1,2-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.7	(Y)	0.184	tbd	0.02	NE
Dichlorobenzene, 1,3-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	NE	tbd	0.02	NE
Dichlorobenzene, 1,4-	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	0.002	tbd	0.02	NE
Hexachlorobenzene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.0003	tbd	0.1	NE
Hexachlorobutadiene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.6	(Y)	0.0009	tbd	0.1	NE
Hexachlorocyclopentadiene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.4	(Y)	345	tbd	0.1	NE
Organonitrogen Compounds													
Carbazole	<13.4 (ND)	NA	<13.4 (ND)	<13.4 (ND)	NA	<13.4 (ND)	<13.4 (ND)	1.8	(Y)	0.12	tbd	0.005	NE
Phenols and Substituted Phenols													
Phenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0	(Y)	0.166	tbd	0.02	NE
Pentachlorophenol	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.8	(Y)	0.00068	tbd	0.054	NE
Phthalate Esters													
Di-n butylphthalate	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.004	tbd	0.02	0.02
Bis(2 ethylhexyl)phthalate	27.6	NA	172	18.7	NA	<6.7 (ND)	172	0.33	Y	0.0004	tbd	0.02	0.02
Polyaromatic Hydrocarbons													
Naphthalene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.561	(Y)	0.004	tbd	0.02	0.02
Acenaphthylene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.2	(Y)	0.146	tbd	0.02	0.02
Acenaphthene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	0.0231	tbd	0.02	0.02
Fluorene	<6.7 (ND)	NA	<6.7 (ND)	5.73	NA	<6.7 (ND)	5.73	0.535	Y	0.048	tbd	0.02	0.02
Phenanthrene	<6.7 (ND)	NA	12.1	20	NA	<6.7 (ND)	20	1.17	Y	0.136	tbd	0.02	0.02
Anthracene	<6.7 (ND)	NA	<6.7 (ND)	18.7	NA	<6.7 (ND)	18.7	0.845	(Y)	0.136	tbd	0.02	0.02
Fluoranthene	<6.7 (ND)	NA	16.3	18.7	NA	<6.7 (ND)	18.7	2.23	Y	0.846	tbd	0.02	0.02
Pyrene	<6.7 (ND)	NA	8.9	12.5	NA	<6.7 (ND)	12.5	1.52	Y	0.195	tbd	0.02	0.02
Benz[a]anthracene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.05	(Y)	0.000038	tbd	0.005	0.005
Chrysene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.29	(Y)	0.0038	tbd	0.005	0.005
Benzo[b]pyrene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.45	(Y)	0.000038	tbd	0.005	0.005
Indeno[1,2,3-cd]pyrene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.1	(Y)	0.000038	tbd	0.005	0.005
Dibenz[a,h]anthracene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	1.3	(Y)	0.0000038	tbd	0.005	0.005
Benzo[g,h,i]perylene	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	NA	<6.7 (ND)	<6.7 (ND)	0.3	(Y)	NE	tbd	0.005	0.005
Chlorinated Dioxins and Furans													
TCDD, 2,3,7,8- (Dioxin)	NA	NA	NA	NA	NA	NA	8.0E-10	8.5 E-10	N	0.0000001	0.000026	5.0002	NE
Polychlorinated Biphenyls (PCBs)													
Aroclor 1016	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.42	(Y)	NE	tbd	0.004	0.01
Aroclor 1242	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.002	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1248	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.004	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1254	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.01	(Y)	0.000004	tbd	0.004	0.01
Aroclor 1260	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.2	(Y)	0.000004	tbd	0.004	0.01
Total PCBs	<0.5 (ND)	NA	<0.5 (ND)	<0.5 (ND)	NA	<0.5 (ND)	5.0E-01	0.676	N	NE	NE	NE	NE
Metals													
Cadmium	2.25	NA	2.75	3.47	NA	<1 (ND)	3.47	0.003	Y	NE	0.04	0.2	NE
Chromium (total)	NA	NA	NA	NA	NA	NA	0	111	N	NE	0.04	0.2	NE
Copper	206	NA	172	203	NA	85.9	206	10	Y	NE	0.01	0.1	NE
Lead	236	NA	176	283	NA	66.6	283	128	Y	NE	0.02	0.05	NE
Zinc	447	NA	365	468	NA	236	468	3	Y	NE	0.1	0.5	NE
Total Petroleum Hydrocarbons													
DRO	NA	NA	NA	NA	NA	NA	0	NE	N	NE	7.1	28	NE
RRO	NA	NA	NA	NA	NA	NA	<0 (ND)	NE	N	NE	4.8	100	NE

Notes:

HP = not present based on NWTPH-HCID (Hydrocarbon identification) analysis
ND = not detected at or above laboratory method reporting limits
— = not analyzed or not applicable.
NE = not established.
mg/kg = milligrams per kilogram
DRO = diesel range organics
RRO = residual-range organics
JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005
Bolded concentrations exceed JSCS screening levels (indicated with a Y)
(Y) indicates analyte not detected, but detection limit is above screening concentration.

* Portland Harbor RIFS, June 24, 2004, Table AS-2,
Analytes, Analytical Concentration Goals and Method
Reporting Limits for Sediment Samples

ACG = Analytical Concentration Goals
MDL = Method Detection Limit
MRL = Method Reporting Limit
PQL = Practical Quantitation Limit
tbd = to be determined

Table 5 - COPCs and Screening Levels for Storm Water

Location ID Sample ID Date Sampled Depth Sampled (feet) Location Constituent of Interest	Lowest JSCS Screening Value µg/L (ppb)
Semi-Volatile Organic Constituents (SVOCs)	
Haogenated Compounds	
Dichlorobenzene, 1,2-	14
Dichlorobenzene, 1,3-	71
Dichlorobenzene, 1,4-	0.5
Hexachlorobenzene	0.000029
Hexachlorobutadiene	0.86
Hexachlorocyclopentadiene	5.2
Organonitrogen Compounds	
Carbazole	3.4
Oxygen-Containing Compounds	
Benzoic Acid	42
Benzyl Alcohol	8.6
Dibenzofuran	3.7
Isophorone	71
Phenols and Substituted Phenols	
Phenol	2,560
Pentachlorophenol	0.3
Phthalate Esters	
Di-n-butylphthalate	3
Bis[2-ethylhexyl]phthalate	0.22
Polyaromatic Hydrocarbons	
Naphthalene	0.2
Acenaphthylene	0.2
Acenaphthene	0.2
Fluorene	0.2
Phenanthrene	0.2
Anthracene	0.2
Fluoranthene	0.2
Pyrene	0.2
Benz[a]anthracene	0.0018
Chrysene	0.0018
Benzo[b]fluoranthene	0.0018
Benzo[k]fluoranthene	0.0018
Benzo[a]pyrene	0.0018
Indeno[1,2,3-cd]pyrene	0.0018
Dibenz[a,h]anthracene	0.0018
Benzo[g,h,i]perylene	0.2
Chlorinated Dioxins and Furans	
TCDD, 2,3,7,8- (Dioxin)	5.1 E-10
Polychlorinated Biphenyls (PCBs)	
Aroclor 1016	0.96
Aroclor 1221	0.28
Aroclor 1232	0.58
Aroclor 1242	0.053
Aroclor 1248	0.081
Aroclor 1254	0.033
Aroclor 1260	94
Total PCBs	0.0000064
Metals	
Cadmium	0.094
Chromium (total)	*100*
Copper	2.7
Lead	0.54
Nickel	16
Zinc	33
Total Petroleum Hydrocarbons	
DRO	NE
Generic Mineral Insulating Oil (RRO)	NE

Notes:

ND = not detected at or above laboratory method reporting limits

— = not analyzed or not applicable.

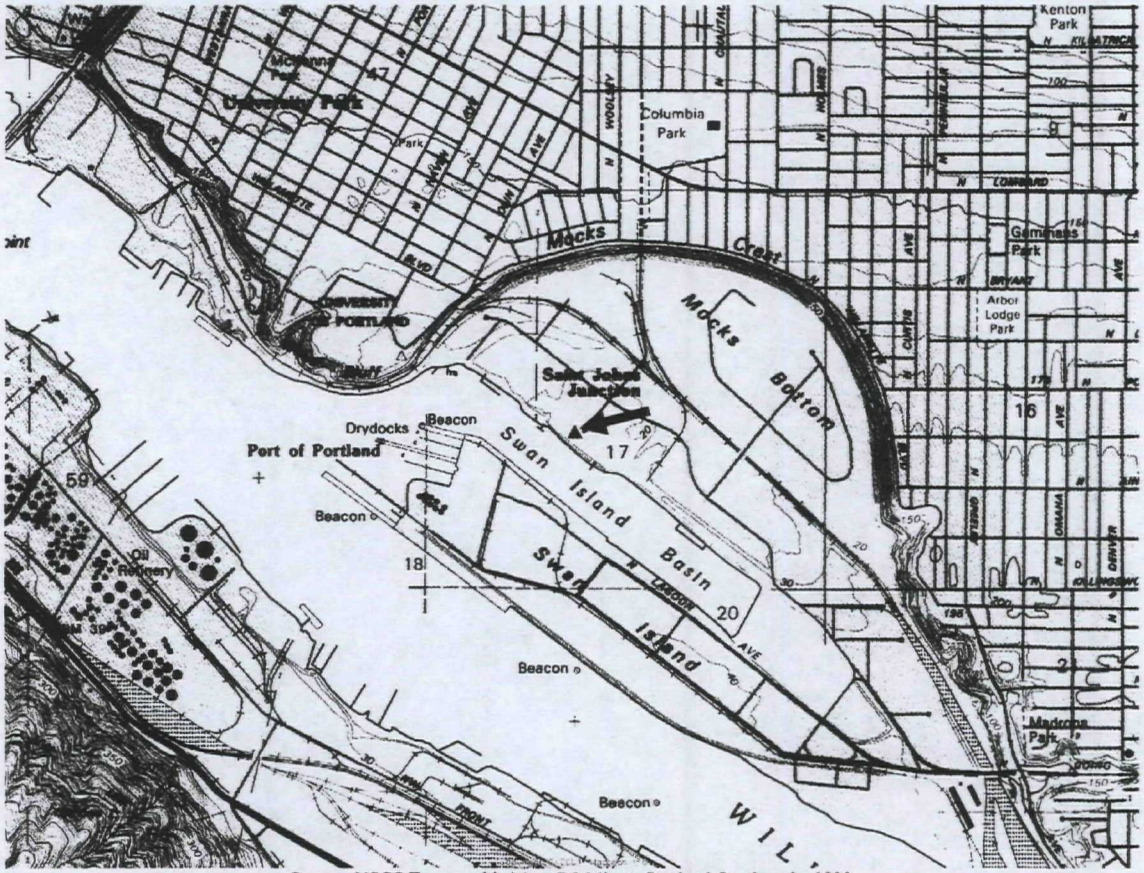
NE = not established.

µg/L = micrograms per Liter

DRO = diesel-range organics.

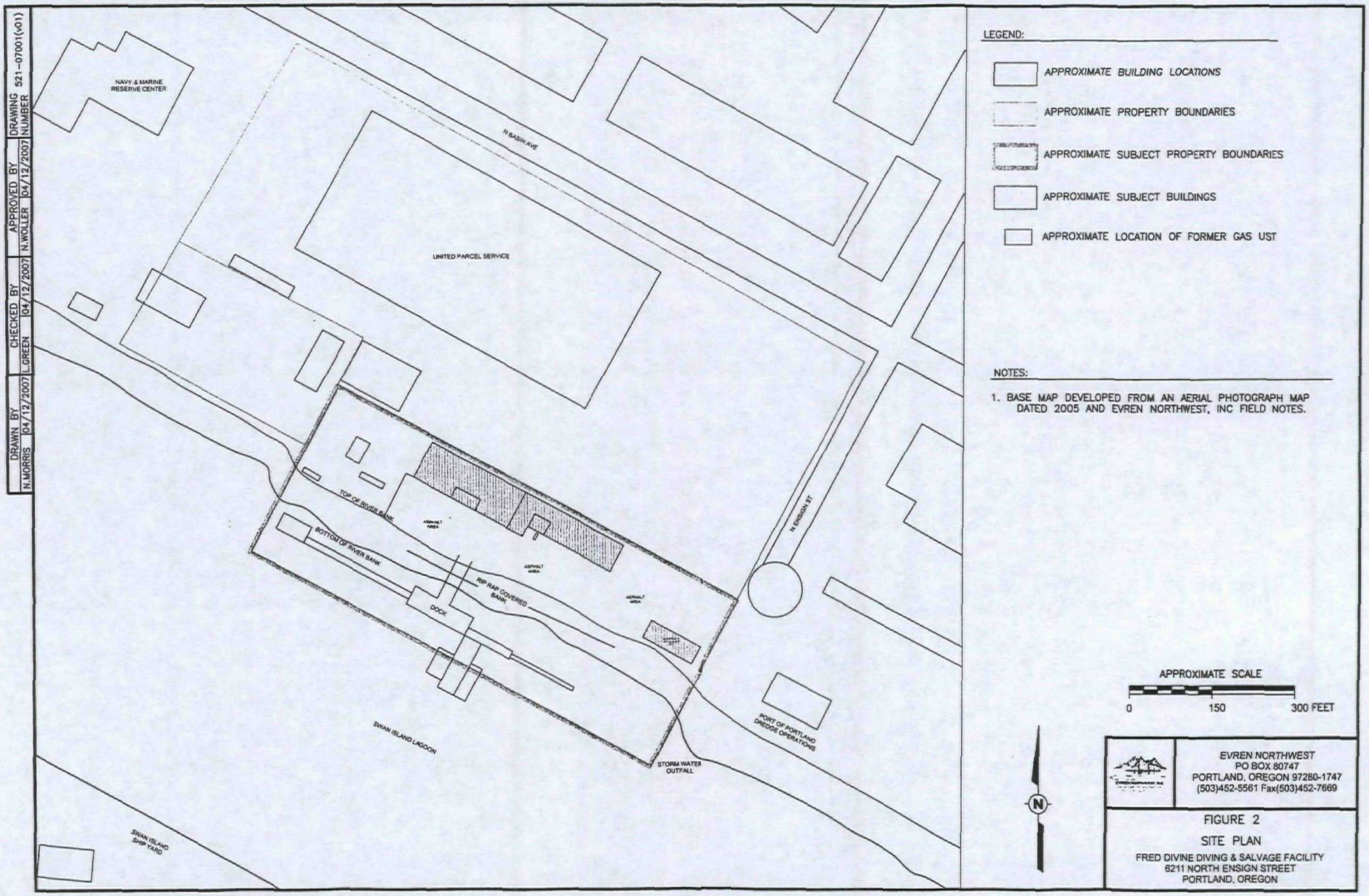
RRO = residual-range organics.

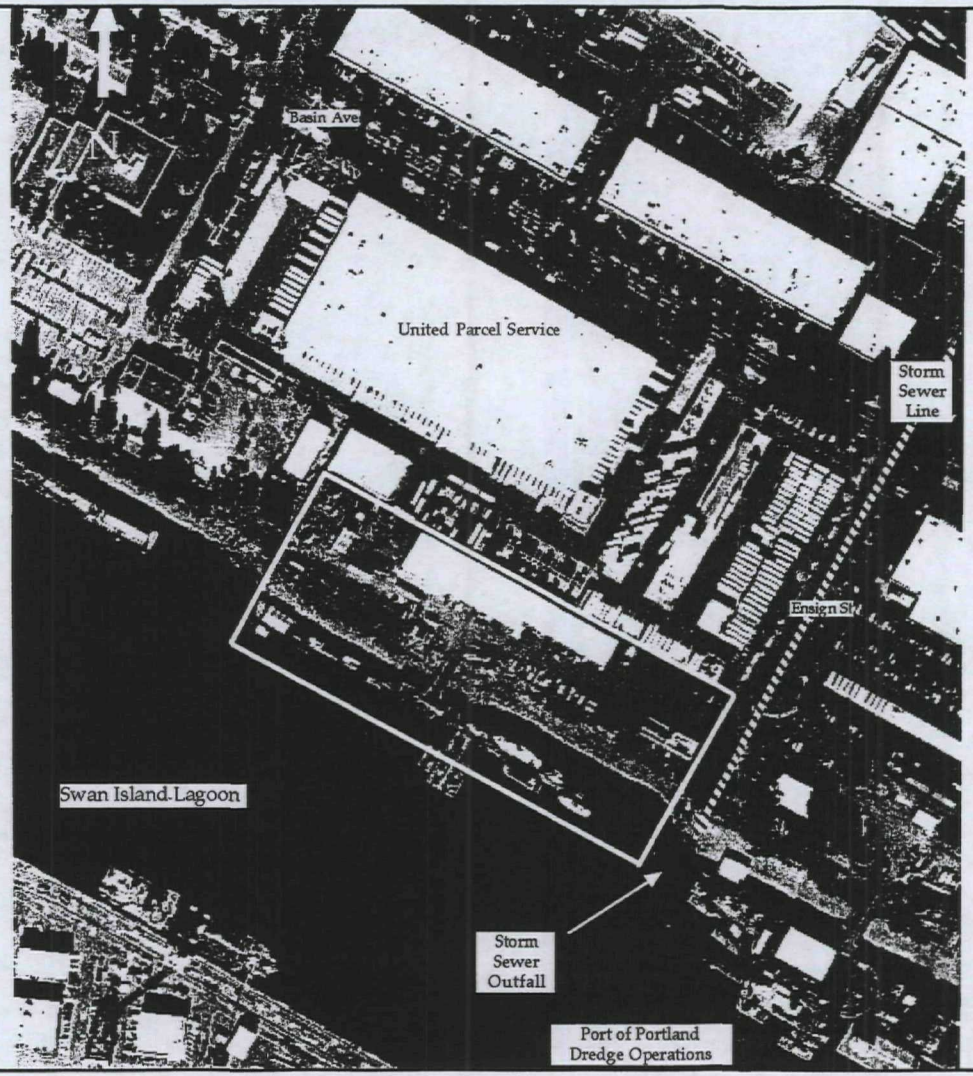
JSCS = Portland Harbor Joint Source Control Strategy, ODEQ and EPA, December 2005



Source: USGS Topographic Map, 7.5-Minute Portland Quadrangle, 1990

ENVIRONMENTAL NORTHWEST	Date Drawn: 4/16/2007 CAD File Name: 521-07001-01svmap.doc Drawn By: LDG Approved By: NMW	Fred Devine Diving & Salvage Co. 6211 N. Ensign Street Portland Oregon For: The Marine Salvage Consortium, Inc.	**Site Vicinity Map**	Project No. 521-07001-01 Figure No. **1**


DRAWN BY N.MORRIS 04/12/2007
CHECKED BY L.GREEN 04/12/2007
APPROVED BY N.MOLLER 04/12/2007
DRAWING NUMBER 521-07001(v01)
NAVY & MARINE RESERVE CENTER
N BASIN AVE
UNITED PARCEL SERVICE
N ENSIGN ST
TOP OF RIVER BANK
BOTTOM OF RIVER BANK
ASPHALT AREA
RIP RAP COVERED BANK
DOCK
SWAN ISLAND LAGOON
STORM WATER OUTFALL
PORT OF PORTLAND DREDGE OPERATIONS
SWAN ISLAND SHOP YARD
LEGEND:
APPROXIMATE BUILDING LOCATIONS
APPROXIMATE PROPERTY BOUNDARIES
APPROXIMATE SUBJECT PROPERTY BOUNDARIES
APPROXIMATE SUBJECT BUILDINGS
APPROXIMATE LOCATION OF FORMER GAS UST
NOTES:
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.
APPROXIMATE SCALE
0
150
300 FEET
N
EVREN NORTHWEST
PO BOX 80747
PORTLAND, OREGON 97280-1747
(503)452-5561 Fax(503)452-7669
FIGURE 2
SITE PLAN
FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON



	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
	N.MORRIS 04/12/2007	L.GREEN 04/12/2007	N.WOLLER 04/12/2007	521-07001(v01)

LEGEND:

APPROXIMATE SUBJECT PROPERTY BOUNDARIES

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.

APPROXIMATE SCALE

0 175 350 FEET

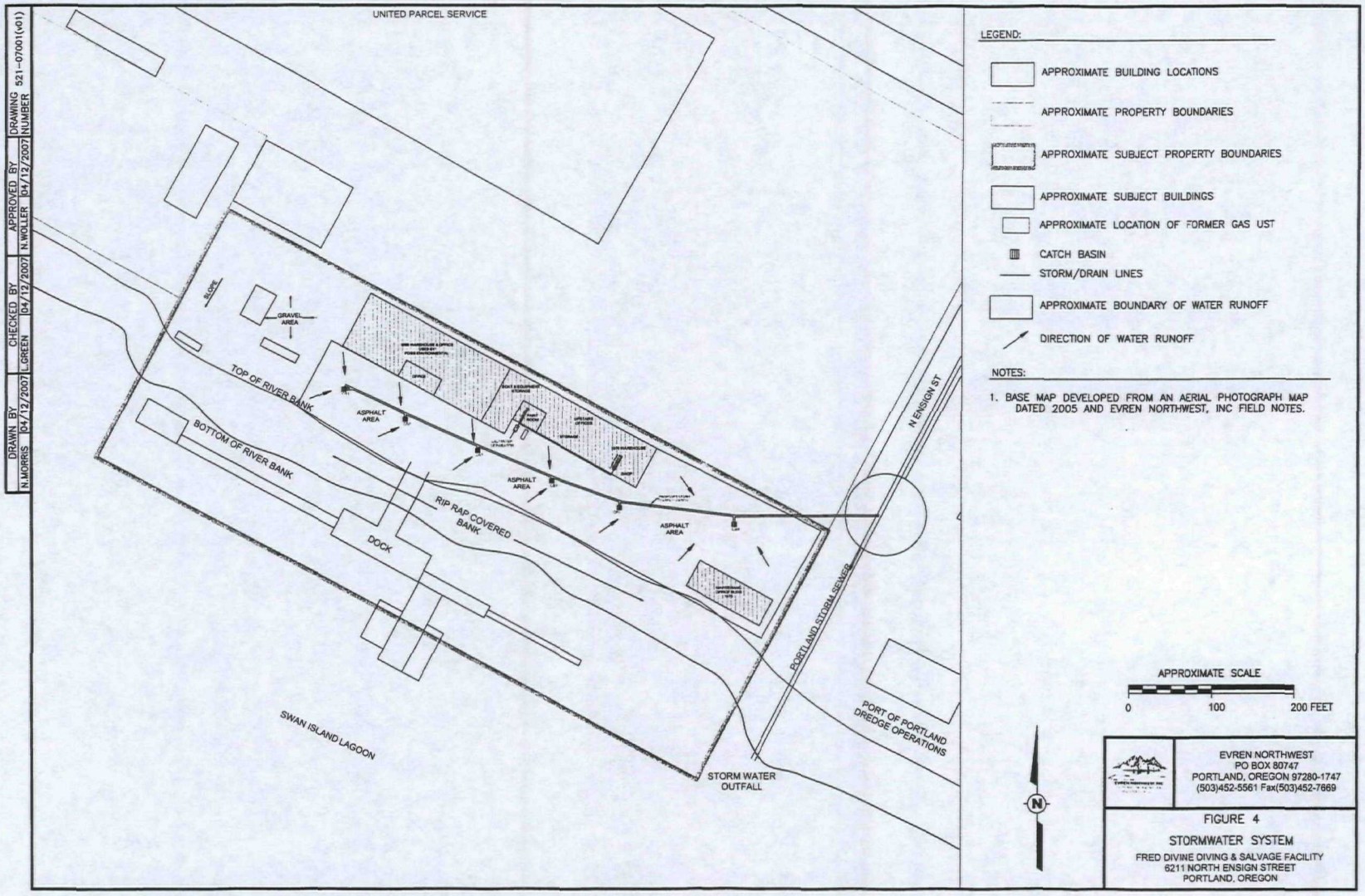
N

EVREN NORTHWEST
PO BOX 80747
PORTLAND, OREGON 97280-1747
(503)452-5561 Fax(503)452-7669

FIGURE 3

AERIAL MAP

FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON



DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
N.MORRIS 04/12/2007	L.GREEN 04/12/2007	N.WOLLER 04/13/2007	521-07001(v01)

EVREN NORTHWEST
PO BOX 80747
PORTLAND, OREGON 97280-1747
(503)452-5561 Fax(503)452-7669

FIGURE 4

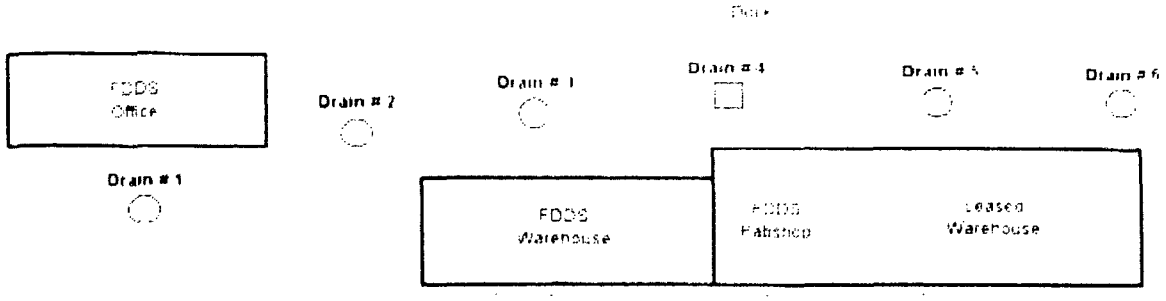
STORMWATER SYSTEM

FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON

APPENDIX A SOURCE CONTROL DOCUMENTATION

Fred Devine Diving and Salvage Co.

Catch Basin Inspection Log



The catch basins located in the company yard, as depicted above, shall be inspected periodically. A catch basin inspection will consist of: removing the grate, visually inspecting the basin for debris/residue accumulation and removing/cleaning accumulation as necessary. Employees will complete the inspection by dating and initialing this log in the appropriate column below according to drain reference number.

Drain # 1		Drain # 2		Drain #3		Drain # 4		Drain # 5		Drain # 6	
Date Inspected	Employee Initials	Date Inspected	Employee Initials	Date Inspected	Employee Initials	Date Inspected	Employee Initials	Date Inspected	Employee Initials	Date Inspected	Employee Initials
6/04	RJ	6/04	RJ	6/04	RJ	6/04	RJ	6/04	RJ	6/04	RJ
9/04	RJ	9/04	RJ	9/04	RJ	9/04	RJ	9/04	RJ	9/04	RJ
12-04	TN	12-04	T.N	12-04	T.N.	12-04	T.N.	12-04	T.N	12-04	T.N.
3/05	RJ	3/05	RJ	3/05	RJ	3/05	RJ	3/05	RJ	3/05	RJ
6-05	T.N.	6-05	T.N	6 05	T.N.	6-05	T.N.	6-05	T.N.	6 05	T.N.
9-05	RJ	9/05	RJ	9/05	RJ	9/05	RJ	9/05	RJ	9/05	RJ
12-05	S.M.	12-05	S.M.	12-05	S.M.	12-05	S.M.	12-05	S.M.	12-05	S.M.
3-06	S.M.	3-06	S.M.	3-06	S.M.	3-06	S.M.	3-06	S.M.	3-06	S.M.
6-06	T.N.	6-06	T.N	6-06	T.N	6-06	T.N.	6-06	T.N.	6-06	T.N.
9-06	T.N.	9-06	T.N.	9-06	T.N.	9-06	T.N.	9-06	T.N.	9-06	T.N.
12 11	RJ	12 11	RJ	12 11	RJ	12 11	RJ	12 11	RJ	12 11	RJ
04-12-07	T.N	04 11 07	T.N	04 11 07	T.N	04 11 07	T.N	04 11 07	T.N	04 11 07	T.N

Marvin Smith
Operations Manager

6/1/04
MA

INVOICE

NRC ENVIRONMENTAL SERVICES, INC.

6211 N Ensign St
Portland, OR 97217
503-283-1150
Fax: 503-289-6568

REMIT TO:
NRC Environmental Services
Box # 2886 PO Box 8500
Philadelphia, PA 19178-2886

Invoice Date: May 19, 2006

Invoice No.: 511131
NRC Job No.: 22547
Purchase Order No.:

Customer: Fred Devine Diving and Salvage
6211 N Ensign St.
Portland, OR 97217

Contact: Mick Lieu
Phone:

Terms: Net 30 Days

Job Description: Vacuum Parking lot catch basins and transport for disposal

Job Location: 6211 N Ensign St Portland, OR 97217

Job Date (s): 05/11/06

Progress Billing:
Final Billing: X

QUANTITY	DESCRIPTION	UOM	UNIT PRICE	EXTENDED PRICE
1	Vacuum Catch Basins	Lot	$210.00	$210.00
1	Disposal	Lot	$137.50	$137.50

INVOICE SUBTOTAL	$347.50
SALES TAX	$0.00
INVOICE TOTAL	$347.50

Currency: USD

THANK YOU FOR YOUR BUSINESS

Mike Bradly, Project Supervisor
503-283-1150

William Annen, Operations Manager

OR CCB #89827
WA CCB #NRCENS963CR
FED ID #: 91-1572532

A 1.5% PER MONTH FINANCE CHARGE WILL BE ASSESSED FOR ALL PAST DUE INVOICES.

Invoice Number: 375425

Customer ID **FRE1400**

Invoice Date 12/08/06
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN ST
PORTLAND, OR 97217-3995

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN ST
PORTLAND, OR 97217-3995

Job No 63 -
Salesperson MAA100

P O Number
Payment Term NET 30

Date	Description	Ref No.	Manifest	CodeQuantity		Unit	Unit Price	Total Price
Due to substantial increases in the cost of petroleum based solvents we are forced to increase pricing on our part washer services by 7%								
12/05/06	PARTS WASHER SVC	BL B182794		12WEEK	1	DRUM 55	249 11	249 11
12/05/06	USED SOLVENT	BL B182794	M82794	12WEEK	35	GALLON	0 00	0 00
12/05/06	USED ANTIFREEZE	BL B182794	M82794	12WEEK	95	GALLON	0 96	91 20
12/05/06	MIXED FUEL	BL B182794		12WEEK	1	DRUM 40	127 50	127 50
12/05/06	FUEL SURCHARGE	BL B182794		12WEEK	1	EACH	7 25	7 25

Amount Subject to Sales Tax
0.00

Amount Exempt from Sales Tax
475 06

Total 475.06

[illegible] EAST MARGINAL WAY SOUTH
SUITE 200
SEATTLE WA 98108
Tel (206) 432 [illegible] Fax No (206) [illegible]
Federal ID No 91 [illegible]

Customer Service Contact [illegible]
Automotive Division
Phone No (206) [illegible]

Invoice Number: 353670

Customer ID **FRE1400**

Invoice Date 08/04/06
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN ST
PORTLAND, OR 97217-3995

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN ST
PORTLAND, OR 97217-3995

Job No 63 -
Salesperson MAA100

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
08/02/06	USED ANTIFREEZE	BL B160589		12WEEK	25	GALLON	0 94	23 50
08/02/06	DRUM - DISPOSAL	BL B160589		12WEEK	1	DRUM 55	25 00	25 00
08/02/06	FUEL SURCHARGE	BL B160589		12WEEK	1	EACH	9 25	9.25

J0051

Amount Subject to Sales Tax 0.00

Amount Exempt from Sales Tax 57.75

Total 57 75

EMERALD SERVICES

Invoice Number 38056

FIELD SERVICES DIVISION
9919 EAST MARGINAL WAY SOUTH
SUITE 200
SEATTLE, WA 98108
Tel [illegible] Fax No (206) 762-0382
Federal ID No [illegible]

Customer Service Contact [illegible]
Field Operations Director [illegible]
Project Mgr [illegible]

Customer ID FRE1400

Invoice Date 12/28/05

Page 1

Bill-to Address:
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND, OR 97217

Site Address
LAND STORAGE TANK
RON JAMES
6211 N ENSIGN
PORTLAND
OR

Job No. 60 - 58650

P.O Number
Payment Term NET30

Date	Description	Ref. No.	Quantity	Unit	Unit Price	Total Price
PROVIDE LABOR EQUIPMENT AND MATERIALS TO PUMP BILGE SLOPS						
12/12/05	WASTE/OILY WATER	GT-21959	540	GALLON	0.21	113.40
	VAC TRUCK-SM		2	HOUR	34.25	68.50
	FUEL SURCHARGE		2	HOUR	6.3	12.60
	DRIVER - ST		2	HOUR	43.15	86.30

Amount Subject to Sales Tax	Amount Exempt from Sales Tax		
0.00	280.80	Subtotal	280.80
		Sales Tax	0.00

[illegible] EA[illegible] MARGINAL WAY SOUTH
SUITE 2[illegible]
SEATTLE WA [illegible]
Tel (206) 832-30[illegible] Fax No. 206 [illegible]
Federal ID No. 91-[illegible]

Customer Service [illegible]
[illegible]
Phone No. (206) 832-[illegible]

Invoice Number: 307975

Customer ID **FRE1400**

Invoice Date: 12/02/05
Page: 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N. ENSIGN
PORTLAND OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N. ENSIGN
PORTLAND
OR

Job No. 99
Salesperson: MAA100

P.O. Number
Payment Term: NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
12/02/05	OILY WATER (NOT USDOT REG)	BL B139249		12WEEK	55	GALLON	0.50	27.50
12/02/05	USED ANTIFREEZE	BL B139249	M68756	12WEEK	55	GALLON	0.94	51.70
12/02/05	DRUM - DISPOSAL	BL B139249		12WEEK	2	DRUM 55	25.00	50.00
12/02/05	FUEL SURCHARGE	BL B139249		12WEEK	1	EACH	7.50	7.50

Amount Subject to Sales Tax
0.00

Amount Exempt from Sales Tax
136.70

Total 136.70

EMERALD RECYCLING

3131 EAST MARGINAL WAY SOUTH
SUITE 200
SEATTLE WA 98134
Tel (206) 832-3000 Fax No (206) 832-3010
Federal ID No 91-1575811

Customer Service Contact Tom Cenens
Package and Petroleum Division
Phone No (206) 832-3011

Invoice Number: 276754

Customer ID **FRE1400**

Invoice Date 06/24/05

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND
OR

Job No 99 -
Salesperson FRE100

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
06/24/05	PARTS WASHER SVC	BL B114867		12WEEK	1	DRUM 50	237 25	237 25
06/24/05	USED SOLVENT	BL B114867	M45948	12WEEK	45	GALLON	0 00	0 00
06/24/05	FUEL SURCHARGE	BL B114867		12WEEK	1	EACH	3 25	3 25

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total	240.50
0.00	240.50		

Invoice Number: 270152

[illegible] EAST MARGINAL WAY [illegible]
[illegible]
SEATTLE WA [illegible]
[illegible] Fax No [illegible]
Federal ID No [illegible]

Customer Service Contact [illegible]
[illegible]
Phone No [illegible]

Customer ID FRE1400

Invoice Date 05/2[illegible]/05
Page [illegible]

Bill to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND
OR

Job No 99
Salesperson HUR100

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
05/19/05	USED ANTIFREEZE	BL B125527	M43713	12WEEK	110	GALLON	0 94	103 40
05/19/05	FUEL SURCHARGE	BL B125527		12WEEK	1	EACH	3 25	3 25

Amount Subject to Sales Tax 0.00

Amount Exempt from Sales Tax 106 65

Total 106.65

Invoice Number: 248980

[illegible]
SEATTLE WA [illegible]
Tel [illegible] Fax No [illegible]
Federal ID No [illegible]

Customer Service Contact [illegible]
Package and Petroleum Division
Phone No [illegible]

Customer ID **FRE1400**

Invoice Date 01/28/05
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N. ENSIGN
PORTLAND, OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND
OR

Job No. 99 -
Salesperson HUR100

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
01/27/05	PARTS WASHER SVC	BL B112864		12WEEK	1	DRUM 50	237 25	237 25
01/27/05	USED SOLVENT	BL B112864	M96786	12WEEK	55	GALLON	0 00	0 00
01/27/05	USED ANTIFREEZE	BL B112864	M35812	12WEEK	145	GALLON	0 94	136.30
01/27/05	FUEL SURCHARGE	BL B112864		12WEEK	1	EACH	3 25	3.25

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total
0.00	376.80	376 80

Invoice Number 19407

Customer ID FRE1400

Page

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND, OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND, OR 97217

Job No 99 -
Salesperson HUR100

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
03/26/04	MIXED FUEL	BOL 126919			1	DRUM 55	130.00	130.00

APR

Amount Subject to Sales Tax
0.00

Amount Exempt from Sales Tax
130.00

Total 130.00

Invoice Number: 184390

Customer ID **FRE1400**

Invoice Date 02/09/04
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND
OR

Job No 99 -
Salesperson HOR100

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
02/04/04	USED ANTIFREEZE	BOL B73674	MC4128	12WEEK	140	GALLON	0 90	126 00

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total
0 00	126.00	126.00

EMERALD RECYCLING

[illegible] EAST MARGINAL WAY SOUTH
SUITE [illegible]
SEATTLE WA 98108
Tel [illegible] Fax No [illegible]
Federal ID No [illegible]

Customer Service Contact: [illegible]
Package and Petroleum Division
Phone No (206) [illegible]

Invoice Number: **164419**

Customer ID **FRE1400**

Invoice Date 09/27/03
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N. ENSIGN
PORTLAND
OR

Job No 41 -
Salesperson THN

P O Number
Payment Term NET 30

Date	Description	Ref. No.	Manifest	Code	Quantity	Unit	Unit Price	Total Price
09/18/03	PARTS WASHER SVC - COM50	BOL 116949		12WEEK	1	DRUM 50	228 00	228 00
09/18/03	USED SOLVENT	BOL 116949	M88976	12WEEK	45	GALLON	0 00	0 00

Amount Subject to Sales Tax 0.00

Amount Exempt from Sales Tax 228.00

Total 228.00

Emerald RECYCLING

Invoice Number: 18381

12 EAST MARGINAL WAY S
SEATTLE WA 98134
Tel (206) 832 3000 Fax No (206) 832 3030
Federal ID No 91-1858671
Customer Service Contact DeAnn Fogarty
Phone No (206) 832-3043

Customer ID: FRE1400

Invoice Date 03/31/03

Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND, OR 97217

Site Address
FRED DEVINE DIVING & SALVAGE
6211 N ENSIGN
PORTLAND OR 97217

Job No.41 -

P O Number
Payment Term NET30

Date	Description	Ref. No.	Profile	Quantity	Unit	Unit Price	Total Price
03/27/03	PAINT THINNERS - AUTO AND MARINE PAINTI	M88041E	CH32618	1	DRUM 55	280	280 00
	TRANSPORTATION			1	EACH	10	10 00
	FUEL SURCHARGE			1	EACH	11 6	11 60

Amount Subject to Sales Tax
0 00

Amount Exempt from Sales Tax
301 60

Subtotal: 301 60

Sales Tax 0.00

Emerald PETROLEUM SERVICE

Invoice Number: 120382

5010 EAST MARGINAL WAY SOUTH
SUITE [illegible]
SEATTLE, WA 98[illegible]
Tel [illegible] Fax No [illegible]
Federal ID No [illegible]

Customer Contact Name [illegible]
Phone No (206) [illegible]

Customer ID **FRE1400**

Invoice Date 10/31/02
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N. ENSIGN
PORTLAND
OR

Job No 41 -
Salesperson SR

P O Number
Payment Term NET 30 DAYS

Date	Description	Ref. No.	Code	Quantity	Unit	Unit Price	Total Price
10/22/02	PARTS WASHER SVC - COM50	BOL B44079	12WEEK	1	DRUM 50	228 00	228.00
10/22/02	USED SOLVENT	M77936	12WEEK	50	GALLON	0.00	0 00

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total
0.00	228.00	228 00

Emerald Petroleum Services

THIS IS NOT AN INVOICE

Tel. (206) 832-3100 or 1-888-832-3008

62931

Bill of Lading

EPA ID # WAD058364842 ID # 91-1573671 24 Hour Emergency Response: 1-800-424-9300

Corporate Office: 7311 E. Marginal Way South, Seattle, WA 98108

Facility Addresses: 3401 Lincoln Avenue, Tacoma, WA 98421

Manifest #

1500 Airport Way South, Seattle, WA 98134 1403 West 13th Street, Vancouver, WA 98660 3808 South Sullivan # N-4, Spokane, WA 99216

Account Name: FRED DEVINE DIVING Date: 4 19 02

Site Address: 6211 N ENSIGN Billing Address:

City: PORTLAND City:

State & Zip: OREGON 97217 State & Zip:

Driver: GINA Equip No: 738

Route Number: 231 Other:

Customer Phone Number: 5032835255 Customer Contact: RON

P.O. Number : Next Service Date:

Qty/Gal	Item		Description	Profile #	Unit Price	Amount
775	UO		Used Oil (Not USDOT Regulated)	G00505		N/C
	CHLOR		Chlor D Tect Test™ ___Pass ___Fail			
	OW		Oil/Water Mixture (Not USDOT Reg)	G00501		
	WCOOL		Used Machine Coolant	G04710		
	WANTI		Used Anti-Freeze (Recycling)			
	WPAD		Used Absorbent Pads	G00504		
	OF100		Used Oil Filters (No Gasket) - Crushed	G04714		
	OF300		Used Oil Filters (No Gasket) - Uncrushed	G04715		
	US		Used Solvent **(REQUIRES MANIFEST)**			
	OWS		Oil/Water Sludge			
	MF		Off Spec Fuel	G02901		
	WDRUM		Drum Disposal			
	SERV		Service Fee			
	NAF	*	Antifreeze, New 100%, 50/50 R/C			
	SOLV	*	Solvent			
	PAD	*	New Absorbent Pads			
	TT	*	Truck/ Operator Time			
			Subtotal			
		*	Sales Tax (%)			
			Total			

I hereby declare that the contents of the consignment are fully and accurately described on the above Bill of Lading by proper DOT shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to 49 C.F.R. I further declare that this material is not regulated as a hazardous or dangerous waste nor mixed with a hazardous or dangerous waste regulated under WAC [illegible] or 40 C.F.R. part 261. Nor does the material contain any detectable quantities of Polychlorinated Biphenyls unless otherwise stated by accompanying manifest. Generator agrees to indemnify and hold harmless Emerald Petroleum Services or its successors harmless for any damages, costs, attorneys, and expert fees arising out of or in any way related to a breach of the above certification.

Customer Signature: Ron Jones Date: 4/19/02

Emerald
PETROLEUM SERVICE

Invoice Number: 90521

[illegible] MARGINAL WAY [illegible]
SEATTLE WA [illegible]
Tel [illegible] Fax No [illegible]
Federal ID No [illegible]

Customer Contact Name [illegible]
Phone No [illegible]

Customer ID **FRE1400**

Invoice Date 01/31/02
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND, OR 97217

Site Address
FRED DEVINE DIVING
6211 N. ENSIGN
PORTLAND, OR 97217

Job No. 41
Salesperson: KM

P O. Number
Payment Term: NET 30 DAYS

Date	Description	Ref. No.	Code	Quantity	Unit	Unit Price	Total Price
01/24/02	USED ANTIFREEZE	BOL 63517	48WEEK	55	GALLON	1.00	55.00

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total
0.00	55 00	55.00

Emerald
PETROLEUM SERVICES

Invoice Number: 86082

[illegible]
SEATTLE, WA 98134
Tel: 206 [illegible] Fax: 206 [illegible]
Federal ID No. [illegible]
Customer Contact Name: [illegible]
Phone No: [illegible]

Customer ID **FRE1400**

Invoice Date 12/14/01
Page 1

Bill-to Address
FRED DEVINE DIVING
RON JAMES
6211 N. ENSIGN
PORTLAND, OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Job No 63 -
Salesperson CF

P O Number
Payment Term NET 30 DAYS

Date	Description	Ref. No.	Code	Quantity	Unit	Unit Price	Total Price
12/07/01	PARTS WASHER SVC - COM50	BOL B28500	12 WEEKS	1	EACH	209 25	209 25

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total	
0.00	209.25		209 25

Emerald
PETROLEUM SERVICES

Invoice Number: 78001

[illegible] EAST MARGINAL WAY SOUTH
SEATTLE WA 98108
Tel [illegible] Fax No [illegible]
Federal ID No [illegible]

Customer Contact Name [illegible]
Phone No (206) 932-[illegible]

Customer ID **FRE1400**

Invoice Date 09/22/01
Page 1

Bill to Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND, OR 97217

Site Address
FRED DEVINE DIVING
RON JAMES
6211 N ENSIGN
PORTLAND OR 97217

Job No. 63 -

P O Number
Payment Term: NET 30 DAYS

Date	Description	Ref. No.	Code	Quantity	Unit	Unit Price	Total Price
09/13/01	PARTS WASHER SVC - COM50	BOL 47079	12 WEEKS	1	EACH	209 25	209 25

Amount Subject to Sales Tax	Amount Exempt from Sales Tax	Total:
0.00	209 25	209.25

APPENDIX B BES CATCH BASIN MAINTENANCE FACT SHEET

Environmentally Responsible Best Management Practices

17 Maintaining Catch Basins

A catch basin is an inlet to a storm drain system that typically includes a grate where stormwater enters the catch basin, and a basin to capture sediment, debris, and associated pollutants. The purpose of the basin is to help prevent the downstream pipes from becoming clogged and to reduce the amount of sediment and debris being discharged into our rivers and streams. Many catch basins are installed with a downturned elbow or tee to trap floatable material. Storm drain inlets that do not contain basins or outlet traps are not effective in reducing pollutants in stormwater.

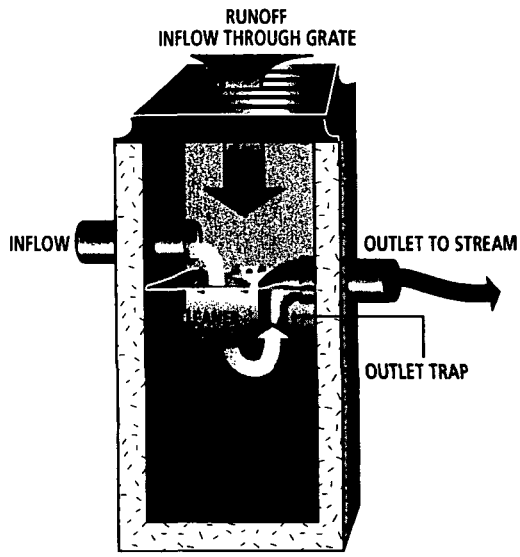
Catch basins must be cleaned periodically to maintain their ability to trap sediment and provide drainage for stormwater. The removal of sediment, decaying debris, and associated pollutants from catch basins has aesthetic and water quality benefits. The benefits include reducing foul odors, solids, and other pollutants that reach receiving waters.

Grates:

- Remove leaves and trash so the grate doesn't clog.
- Stencil the message "Dump No Waste, Drains to Stream" next to your grates. Call the City's Industrial Stormwater Program at 503-823-5320 to borrow the materials you need.

Catch Basin:

- The more frequently a catch basin is cleaned, the more pollutants it removes. The U.S. Environmental Protection Agency (EPA) recommends cleaning if the depth of solids reaches one-third the depth from the basin bottom to the invert of the lowest pipe into or out of the basin.
- Clean the catch basin. You can hire a contractor or you can do it yourself by lifting the grate and using a bucket (to remove water) and a shovel.



- Dispose of the water in a sanitary sewer through a shop drain or sink. Otherwise, use a toilet or other appropriate drain. Let the removed solids dry out, then properly dispose of them. When deciding how to dispose of the sediment, you need to consider the types of activities and pollutants on site. Catch basins in areas used for chemical or hazardous waste storage, material handling or equipment maintenance may collect the chemicals used in these activities from spills or via stormwater runoff. Solids removed from catch basins at commercial or industrial sites are usually not considered hazardous waste.

However, as the "generator" of this waste, you are responsible for making that decision and deciding how to properly manage the solids. If you need assistance deciding whether the solids should be managed as a hazardous waste, contact the Oregon Department of Environmental Quality at 503-229-5263. Make sure the removed solids don't wash back into your catch basin, and don't dispose of it on your or someone else's property.

continued on back

Be sure to follow safety precautions:

- The grate may be heavy.
- Don't leave an open catch basin unattended.
- Never enter a catch basin or other drainage structure unless you are properly trained.
- Ensure proper traffic safety is in place.

Tips:

- Sweep your lot regularly to reduce the need for catch basin cleaning.
- Consider installing and maintaining catch basin inserts or an oil-absorbent pillow.
- Repair or replace damaged outlet traps.
- Install an outlet trap if there isn't one already. They're inexpensive and make it easier and cheaper to remove any floatable pollutants that spill into your catch basin.
- Make sure your chemical and waste storage practices aren't exposed to rainfall and stormwater runoff.
- Don't wash vehicles or equipment to the storm sewer system.

For additional Best Management Practices to minimize pollution from other site activities call 503-823-5320.

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

Dan Saltzman, Commissioner Dean Marriott, Director

Printed on recycled paper. PP 0401

APPENDIX C CITY OF PORTLAND STANDARD OPERATING PROCEDURES FOR SAMPLING SEDIMENTWASTE RECEIPTS

Standard Operating Procedures

Guidance for Sampling of Catch Basin Solids

Prepared for

City of Portland

July 2003

Prepared by

CH2MHILL

VERSION 1.0
PDX/031550010.DOC

Printed on Recycled and Recyclable Paper

VERSION 1.0
PDX/031550010.DOC

Contents

Standard Operating Procedures—Guidance for Sampling of Catch Basin Solids

1.0 Purpose

This document describes Standard Operating Procedures (SOPs) for the collection of environmental solids samples from stormwater catch basins. It provides procedures to be used for assessing potential pathways of contamination from upland sources via stormwater conveyances to receiving waters and sediments. Sampling for environmental investigations requires different methods than those that may be used for determining waste profiles for catch basin solids disposal.

The procedures described here are intended to provide representative samples of catch basin contents. These procedures may be modified for other purposes, such as assessing characteristics of older or newer solids, or because of space or access limitations. All deviations from these SOPs should be noted in field logs and reports.

1.1 Background

Catch basins are typically designed to prevent debris, gravels, and soils from fouling storm drain lines, and generally remove larger particles (greater than approximately 1 millimeter in diameter). Unlike specially designed stormwater treatment vaults, catch basins are not intended to remove fine particles or soluble pollutants, and they may only marginally reduce concentrations of contaminants or suspended solids. Catch basin retention efficiencies for suspended solids may be highly variable as functions of basin design, stormwater flow rates, accumulated solids in the sump (a function of cleaning frequency), and solids particle characteristics. Finer particle fractions may be suspended in moving water and carried beyond the catch basin. Because these finer particles are often correlated with organic and inorganic contaminants, special care needs to be taken while collecting catch basin solids samples to ensure that the finer particle fraction is sampled.

2.0 Scope and Applicability

The methodologies discussed in these SOPs are intended to provide procedures for collecting representative environmental samples of solids in stormwater catch basins. These SOPs describe specific steps that can be used to ensure representative and comparable data.

Residual material in catch basins is inherently variable. Factors that can affect variability include the characteristics of catch basin structures, the sources of particles, water flow rates and stormwater quality, and the depth and pattern of accumulated solids. In addition, the characteristics of catch basin solids can vary from slurry-like to dry solids. Although variability may be unavoidable, standard methods of collecting and handling samples can improve data quality.

3.0 Equipment and Materials

The following equipment should be available for collecting solids samples from catch basins:

- Sampler (generally one type will be selected per catch basin)
  - Stainless steel scoop, trowel, or spoon
  - Bucket (hand) auger
  - Hand corer
  - Petite Ponar® dredge/Van Veen® dredge (0.025 square meter [m^2])
- Sampling Equipment List
  - Site Sampling and Analysis Plan and/or site files detailing sampling locations, sample collection, and site information
  - Large stainless steel bowl
  - Stainless steel mixing spoon
  - Latex gloves
  - Metal or wooden rod
  - Field data sheets or other documentation
  - Laboratory-supplied sample containers
  - Cooler and ice/chilled blue ice
  - Tape measure
  - Ziploc® bags
  - Field notebook
  - Permanent marking pens
  - Sample labels
  - Chain-of-custody seals
  - Personal Protective Equipment (PPE)

4.0 Procedures

4.1 Documentation

Regardless of the equipment to be used, the following general procedures apply:

- Confirm any active catch basin best management practices such as sweeping and cleaning, frequency of activity, etc., if known.
- Document design flow rates (base flow, storm flow) for catch basins, if known.
- Record weather conditions at the time of sampling and last known rainfall event(s).
- Record the location of the catch basin. Include potential solids or contaminant sources such as construction activities, erosion, equipment storage or use, waste or material storage, vehicles, exhaust vents, onsite processes, etc. Site features, distances, flow directions, and gradients should be noted or sketched on a site map.

- Record dimensions of catch basin. Diagram inlet/outlet pipes in the catch basin. The source of inlet flows and destination of outlet flows should be noted, if known.
- Note the presence of water, visible flows, signs of flooding, clogging, debris in or around the catch basin, blocked inlets/outlets, staining, etc.
- Note any apparent evidence of contamination in the catch basin, such as odor, sheen, discoloration, etc., of water or solids.
- Measure the depth of solids in the catch basin and the total depth of the catch basin or sump. Use a decontaminated metal rod or disposable wooden dowel to probe the total depth of the catch basin.
- When recovering samples, record visual observations of:
  - Color
  - Texture, estimates of particle size fractions (as soil classification)
  - Amount and type of debris (Note: any large debris observed in the sample, including sticks, leaves, beverage containers, miscellaneous pieces of plastic and metal, stones and gravel, etc., should be removed, but paint chips and small organic matter should be left in the sample)
- Prepare a diagram of sampling locations within the catch basin, noting any special features such as sumps, inlets and outlets, etc.
- Decontaminate all sampling equipment using documented procedures before and after any sampling activities. Record the decontamination procedures in the field notes.
- Record any deviations from the specified sampling procedures or any obstacles encountered.
- Complete a chain-of-custody form for all samples.

4.2 Selection of Sampling Method

Sampling equipment should be matched with the presence and depth of water, solids water content, and catch basin depth. Figure 1 presents a flow chart for determining the appropriate sampling device. Detailed descriptions of each sampling method are presented in Section 4.3.

4.2.1 Decontamination of Equipment

Non-disposable equipment that contacts solids samples should be thoroughly cleaned and decontaminated before each set of samples is collected. Decontamination should be done in accordance with City of Portland SOP 7.01a[1] or comparable standard. Decontamination solutions should be selected on the basis of the type of analysis being conducted on samples.

[1] Bureau of Environmental Services, Environmental Investigations Division, SOP No. 7.01a Draft or subsequent revisions, Decontamination of Sampling Equipment.

4.3 Sample Collection

This guidance for sampling catch basins is intended to assess individual catch basins as potential sources of past, present, or future conduits of contamination to Willamette River sediments. Sample collection should therefore incorporate material representative of the total depth and area unless specific alternative sampling objectives are otherwise noted and approved. In some cases, sample collection from discrete depths may be desired based on knowledge of catch basin maintenance and time since last cleaning, activities conducted within the drainage area, spills or releases, and related information.

Standing water in the catch basin, if present, may be pumped off to simplify sample collection. If this procedure is conducted, care must be taken to:

- Pump water from the surface only
- Leave a thin layer of water so that fine materials in the solids are not disturbed
- Pump water slowly so that fine materials are not disturbed
- Dispose of pumped water in the sanitary sewer (pumped water may not be released into the storm system)
- Document all steps taken, the depth and volume of water removed, the point of water disposal, water remaining before sampling, and other relevant factors

4.3.1 Sampling Firm Solids in Catch Basins Without Standing Water

Firm solids above the water line are most easily collected using simple soil sampling tools (that is, stainless steel spoon or trowel, or bucket auger). When sampling with a spoon or auger, solids may be moist or wet but should retain their form and structure when handled. (Note: If the sample has a high water content [water drips from solids], another sampling method should be considered to minimize the loss of fine particles in liquid drainage.)

4.3.1.1 Stainless Steel Spoon, Scoop, or Trowel

If necessary, the spoon, scoop, or trowel may be attached to an extension pole in order to reach the bottom of the catch basin, provided a representative sample can be retained on the spoon and recovered intact.

The following procedure defines steps to be taken when sampling dry or moist solids with a stainless steel spoon, scoop, or trowel:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Using a decontaminated stainless steel spoon, scoop, or trowel, collect an equal amount of material from five locations: each corner (or, if round, each compass point) and the center. Material recovered at each point should be a composite of the total depth of accumulated material, unless otherwise specified in the sampling plan.

5. Place sampled solids into a decontaminated stainless steel bowl or tray. Repeat step 4 as necessary in order to obtain the required volume, and mix to homogenize thoroughly using a decontaminated or disposable stainless steel spoon.
6. Collect a suitable portion of the mixed solids with a decontaminated or disposable stainless steel spoon and place into each appropriate sample container.
7. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
8. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.
9. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.
10. Complete the chain-of-custody documents.

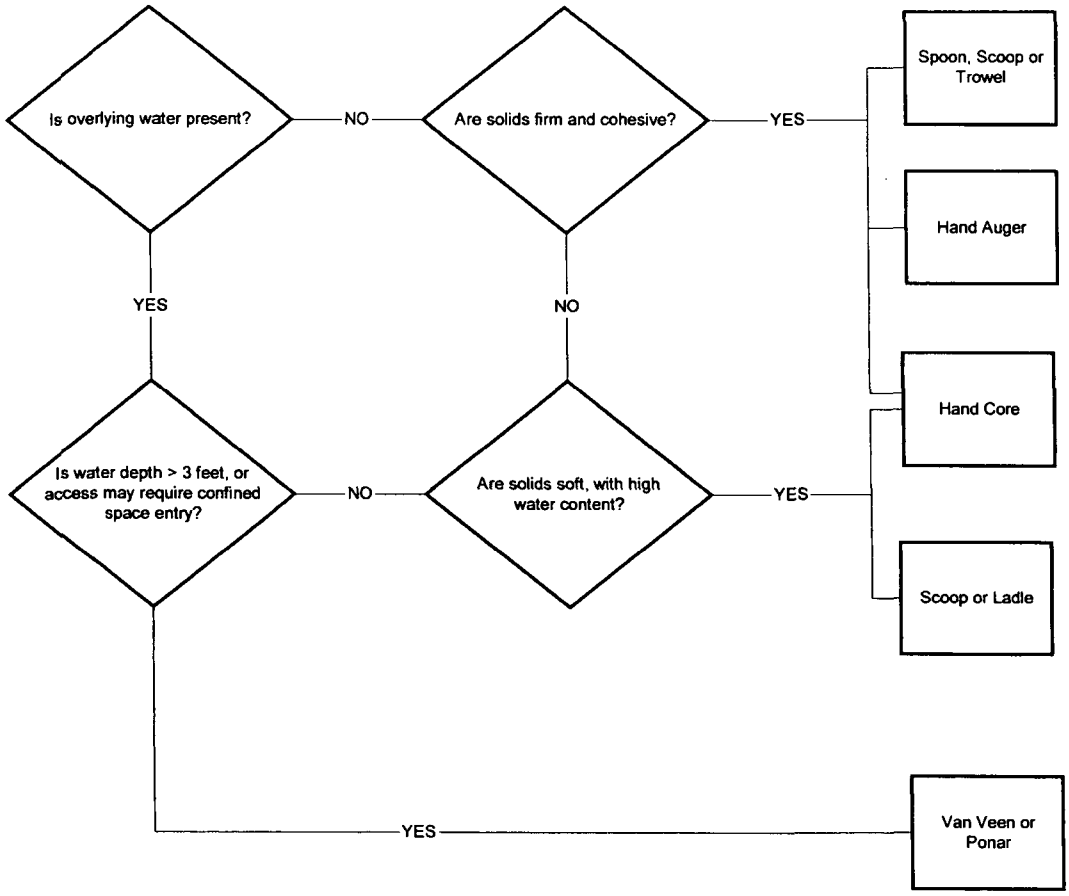
4.3.1.2 Stainless Steel Bucket Auger (Hand Auger)

Bucket augers are applicable to the same situations and materials as the spoon, scoop, and trowel method described above. Most bucket augers have long handles (> 4 feet), and some can be fitted with extension handles that will allow the collection of solids from deeper catch basins.

The following procedure defines steps to be taken when sampling dry or moist solids with a stainless steel bucket auger:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Advance a thoroughly cleaned and decontaminated bucket auger into catch basin solids in each corner (or, if round, each compass point) and the center of the catch basin. Material recovered at each point should be a composite of the total depth of accumulated material, unless otherwise specified in the sampling plan.
5. Empty the auger into a stainless steel bowl or tray. Repeat step 4 as necessary in order to obtain the required volume and mix to homogenize thoroughly, using a decontaminated or disposable stainless steel spoon.
6. Collect a suitable portion of the mixed solids with a decontaminated or disposable stainless steel spoon and place the sample into each appropriate sample container.

Figure 1. Flow Chart for Selecting the Appropriate Catch Basin Solids Sampler



7. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
8. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.
9. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.
10. Complete the chain-of-custody documents.

4.3.2 Sampling Solids in Catch Basins with Standing Water

Hand corers or dredge samplers should be used when standing water is present in catch basins to prevent washout of sample material when the sampler is retrieved through the water column. Corers may also be used for dry and moist solids. Some hand corers can be fitted with extension handles that will allow the collection of samples in deeper basins.

4.3.2.1 Hand Corers

The following procedure defines steps to be taken when sampling saturated solids with a stainless steel hand corer:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Using a thoroughly cleaned and decontaminated corer, advance the sampler into catch basin solids with a smooth, continuous motion, twist corer, and then withdraw it in a single motion.
5. Remove the nosepiece and withdraw the sample into a stainless steel bowl or tray.
6. Repeat steps 4 and 5 in each corner (or, if round, each compass point) and the center of the catch basin. Material recovered at each point should be a composite of the total depth of accumulated material, unless otherwise specified in the sampling plan.
7. Mix to homogenize thoroughly, using a decontaminated or disposable stainless steel spoon.
8. Collect a suitable portion of the mixed solids with the decontaminated or disposable stainless steel spoon and place into each appropriate sample container.
9. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
10. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.

11. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.

12. Complete the chain-of-custody documents.

4.3.2.2 Clamshell-Type Dredge Samplers

Clamshell-type dredge samplers like the Petite Poner® and Van Veen® 0.025-m^2 dredge sampler are capable of sampling moist and wet solids, including those below standing water. However, penetration depths usually will not exceed several inches, so it may not be possible to collect a representative sample if the solids layer is greater than several inches. The sampling action of these devices causes agitation currents that may temporarily resuspend some settled solids. This disturbance can be minimized by lowering the sampler slowly and by allowing slow contact with the solids.

Samples collected with clamshell-type dredge samplers should meet the following acceptability criteria in order to ensure that representative samples have been collected (EPA, 2001):

- Solids do not extrude from the upper surface of the sampler.
- Overlying water is present in the sampler (indicating minimal leakage).
- Overlying water is clear and not excessively turbid.
- Desired depth of penetration has been achieved.
- The solids-water interface is intact and relatively flat, with no sign of channeling or sample washout.
- There is no evidence of sample loss.

The following procedure defines steps to be taken when sampling moist, wet, or submerged solids with a dredge sampler:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Using a thoroughly cleaned and decontaminated dredge-type sampler and working on a clean, decontaminated surface, arrange the sampler in the open position, setting the trip bar so that the sampler remains open when lifted from the top.
5. Slowly lower the sampler to a point just above the solids surface.
6. Drop the sampler sharply into the solids, then pull sharply on the line, thus releasing the trip bar and closing the dredge.
7. Raise the sampler and place on a clean surface. Slowly decant or siphon any free liquid through the top of the sampler. Take care to ensure that fines are not lost in the process; if necessary, allow the sampler to sit and the fine particles to settle before decanting or siphoning free liquid.

8. Open the dredge and transfer the solids into a large stainless steel bowl or tray of sufficient size to receive three sample loads.
9. Repeat steps 4 through 8 in diagonal corners (or, if round, two opposite compass points) and the center of the catch basin. Material recovered at each point should be representative of the total depth of solids in the sampling device. If necessary, modify sampling points to correspond to catch basin size or dimensions. Record any deviations in the field notes.
10. Mix to homogenize thoroughly, using a decontaminated or disposable stainless steel spoon.
11. Collect a suitable portion of the mixed solids with a decontaminated or disposable stainless steel spoon and place into each appropriate sample container.
12. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
13. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.
14. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.
15. Complete the chain-of-custody documents.

5.0 Sample Acceptability

Only solids that are collected correctly with grab or core sampling devices should be used for subsequent physicochemical testing. Acceptability of grabs can be ascertained by noting that the samplers are closed when retrieved, are relatively full of solids (but not overfilled), and do not appear to have lost surficial fines. Core samples are acceptable if the core was inserted vertically in the solids and an adequate depth was sampled without significant loss out the mouth of the corer.

6.0 Quality Assurance and Quality Control

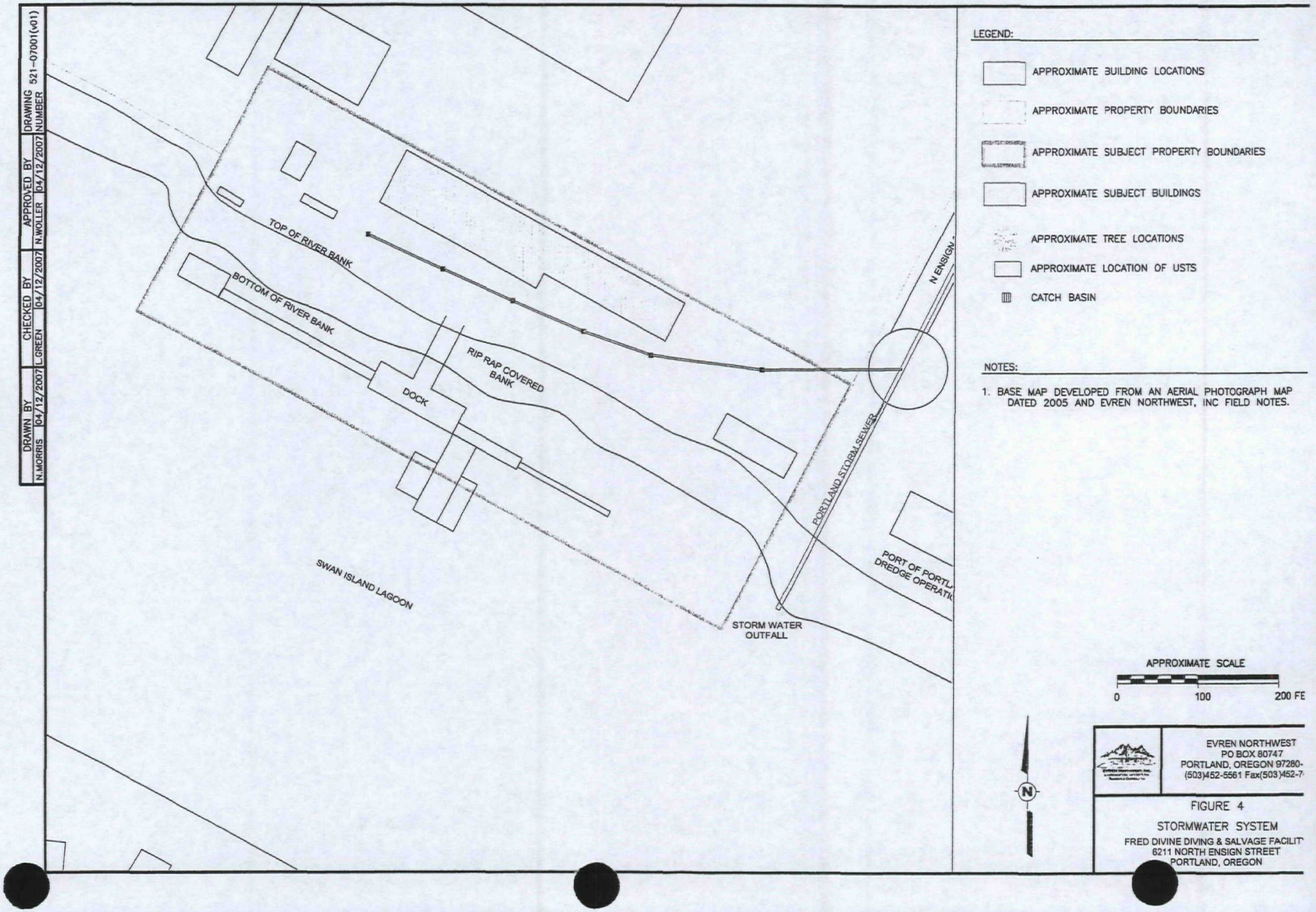
A rinsate sample may be appropriate or required when non-disposable sampling equipment is used. The equipment rinsate should be collected between sampling locations and after the device has been decontaminated. The rinsate sample should be analyzed for the same parameters analyzed for in solids.

7.0 Resources

1. ASTM. September 1994. Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediment for Toxicological Testing. American Society for Testing and Materials (E 1391-94). West Conshohocken, Pennsylvania.

2. EPA. 1987. A Compendium of Superfund Field Operations Methods, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response (EPA/540/P-87/001), Washington, D.C.

3. EPA. 2001. Methods for Collection, Storage, and Manipulation of Sediment for Chemical and Toxicological Analyses: Technical Manual. U.S. Environmental Protection Agency, Office of Water (EPA-823-B-01-002). Washington, D.C. October 2001.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N.MORRIS
04/12/2007
CHECKED BY
L.GREEN
04/12/2007
APPROVED BY
N.WOLLER
04/12/2007
DRAWING NUMBER
521-07001(v01)
TOP OF RIVER BANK
BOTTOM OF RIVER BANK
RIP RAP COVERED BANK
DOCK
SWAN ISLAND LAGOON
STORM WATER OUTFALL
PORTLAND STORM SEWER
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LEGEND:
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APPROXIMATE PROPERTY BOUNDARIES
APPROXIMATE SUBJECT PROPERTY BOUNDARIES
APPROXIMATE SUBJECT BUILDINGS
APPROXIMATE TREE LOCATIONS
APPROXIMATE LOCATION OF USTS
CATCH BASIN
NOTES:
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.
APPROXIMATE SCALE
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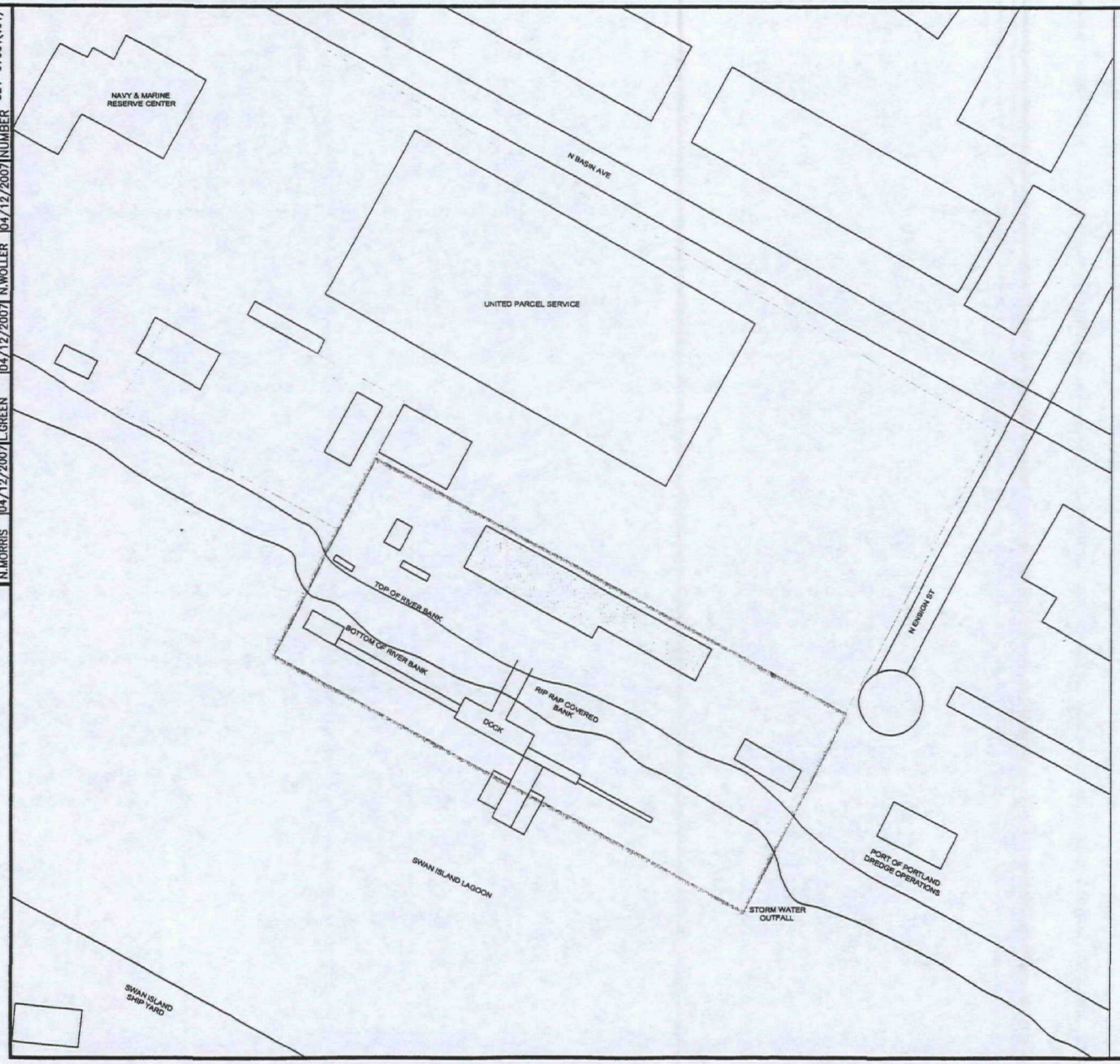
EVREN NORTHWEST
PO BOX 80747
PORTLAND, OREGON 97280-
(503)452-5561 Fax(503)452-7
FIGURE 4
STORMWATER SYSTEM
FRED DIVINE DIVING & SALVAGE FACILIT
6211 NORTH ENSIGN STREET
PORTLAND, OREGON

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
N.MORRIS 04/12/2007	L.GREEN 04/12/2007	N.WOLLER 04/12/2007	521-070001(v01)



LEGEND:

- APPROXIMATE BUILDING LOCATIONS
- APPROXIMATE PROPERTY BOUNDARIES
- APPROXIMATE SUBJECT PROPERTY BOUNDARIES
- APPROXIMATE SUBJECT BUILDINGS
- APPROXIMATE TREE LOCATIONS
- APPROXIMATE LOCATION OF USTS
- CATCH BASIN

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.

APPROXIMATE SCALE

0 150 300 FEET

N

EVREN NORTHWEST
PO BOX 80747
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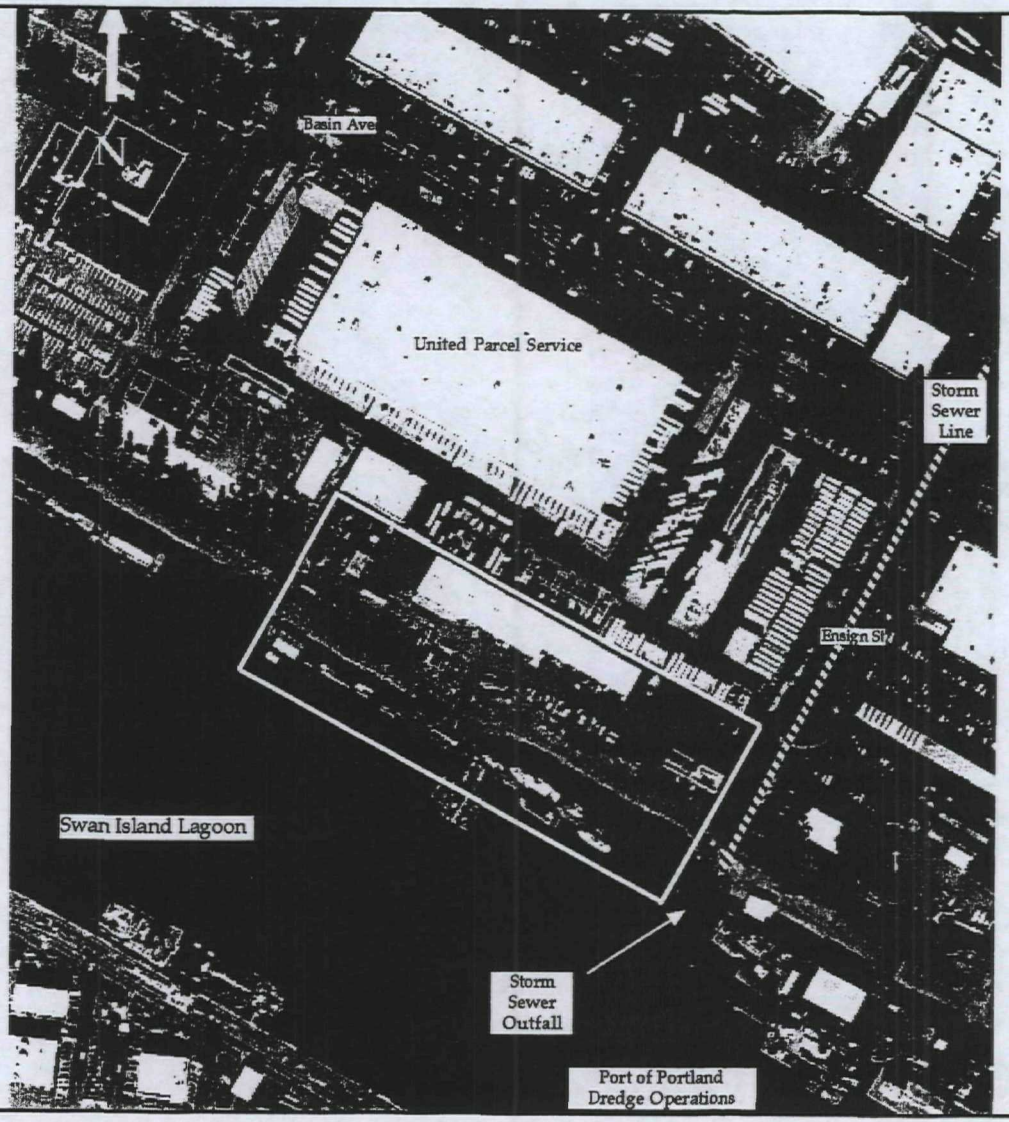
(503)452-5561 Fax(503)452-7669

FIGURE 2

SITE PLAN

FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON

DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
N.MORRIS	04/12/2007	L.GREEN	04/12/2007	N.WOLLER	04/12/2007	521-07001(v01)



LEGEND:

APPROXIMATE SUBJECT PROPERTY BOUNDARIES

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2005 AND EVREN NORTHWEST, INC FIELD NOTES.

APPROXIMATE SCALE

0 175 350 FEET

N

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FIGURE 3

AERIAL MAP

FRED DIVINE DIVING & SALVAGE FACILITY
6211 NORTH ENSIGN STREET
PORTLAND, OREGON